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RAILWAY ARCHITECTURE.

THE recent display of prize drawings at the Royal Institute has awakened interest in a branch of architecture which is curiously apart from professional politics in England—the design of railway-stations. It would almost appear as though this competition came as a sudden and unexpected reminder that an architect might, in certain circumstances, actually be involved in such a scheme. The ability of the ambitious student to deal with a terminal station on the grand scale was sufficiently tested in this case, and the published opinions of the critics have an added interest in view of the novelty of the subject. Apart from draughtsmanship, it was generally agreed that the two principal objects to be achieved were, firstly, to produce a monumental approach to a great city, and, secondly, to satisfy the increasingly complex requirements of railway traffic. With the first of these objects we are little concerned here, for the principles of sound design hold good for all monumental buildings, and what one could say in regard to the external appearance of a railway-station would apply equally to municipal offices or to a theatre.

But it was pointed out to some competitors on this occasion with considerable pertinency that, admirable as was their architecture in the abstract, it lacked a grasp of modern practice in station design, and was, in fact, behind the times. For all through the eighty years that have elapsed since the first railway-station was completed there has never been such rapid progress made as in the last decade. A new definite type of building has been evolved from strictly practical elements, and it opens up almost unlimited possibilities of an æsthetic nature. It is interesting to recall the principal landmarks in the history of English railway architecture in so far as they indicate the spirit which animated its designers.

When first it became necessary to provide some kind of shelter for the adventurous travellers who risked their lives in the quaint trains of the thirties, imagination played little part in the form of the bare sheds where goods and passengers competed for precedence. Indeed, the idea of protecting goods from the weather probably entered men's heads before they thought of their own comfort, and the first stations (at Stockton and at Canterbury) were merely goods sheds.

There is, however, much to be learned from a study of these primitive types, for they served their purpose with a commendable simplicity—a simplicity which is as apparent in the severe yet satisfying lines of their plain exteriors as it is in the ascetic rigour of the train shed within. For these were the days of the Greek Revival, and the characteristic refinement of that movement nowhere appears to better advantage than in the external features of the railway terminus. The masterpieces of Decimus Burton in Hyde Park are paralleled by the great portico at Euston; while among since-destroyed examples of the same period should be mentioned the triumphal arch outside Birmingham Station and the screen at Bishop's-road, near Paddington. The earliest stations had timber roofs with trusses of low pitch, but this system soon gave way to iron construction, of which an instance still survives at Euston. The point to be emphasised is that in these days architecture and civil engineering went hand-in-hand, so that the simple masonry of an arch, or even of a retaining wall, had all those admirable qualities of perfect fitness that make the Parthenon immortal. It should be added that a sense of dignity in arranging the approaches marks these buildings, and that the congested ineptitude of the Victorian station-yard had not yet made its unwelcome appearance.

Of all the great termini in London and in the provinces built between the late thirties and our own times, the majority are beneath contempt, and perhaps only one stands out with notable prominence. St. Pancras is a large though not a colossal station. Its architecture is of a period now out of favour in the profession, and in the greatest possible contrast to the Greek Revival style which we have just mentioned. Yet it is a masterly conception, and may even be regarded as the most remarkable work of the Gothic Revival. The design was prepared by Sir Gilbert Scott in a limited competition, and the circumstances under which he worked are narrated in his reminiscences. Here, it will be noticed, is an instance of an outside architect providing a building on the skeleton lines laid down by the railway company's engineer, and thus there is a clear division between the functions of each. It is hardly just to Scott's reputation to say that his work was limited to decorative features, while everything of structural importance must be attributed to his colleague. This station should rather be regarded as an exceptionally happy case of collaboration than as an argument for or against specialised functions. It may also be cited as a proof that railway-station design does not necessitate the use of any one style of architecture. And, lastly, it is a standing witness of the forethought of its promoters in providing accommodation which is ample enough for future needs, and so has escaped the trumpery outhouses and sheds which surround most of the earlier termini.

From St. Pancras one passes to the small but instructive series of recent reconstructions in this country, on the Continent, and in America, and it becomes possible to speak of a prevailing generic type as the modern station. This type is gradually becoming standardised and international, and may even become more so. It conforms to sound engineering requirements, and is far more simple in theory than its predecessors, except the very earliest of all. Compare, for instance, the leviathan structure which is rising out of the ramshackle hovels at Waterloo, or the almost equally fine example at Victoria on the Brighton Railway. The plans are nearly identical, and if Marylebone Station were completed it would present very similar general features of arrangement. In each case we may regard these termini as having platforms at street level, for at Waterloo the approaches are inclined to produce that effect in practice. The lines are normal to the main frontage, and so result in what the Americans call a "stub" terminus. Naturally this type allows of the best architectural treatment, with an hotel or offices over the public booking-halls forming the main block. Unfortunately the problem of the covered portion of the station-yard for vehicles has not been satisfactorily solved in any of these cases, and destroys the proportions of the façade. At St. Pancras, although technically a stub terminus, carriages enter under a great arch in the ground floor of the hotel façade and deliver passengers at the side of the train shed, on the main departure platform. The glass roof is thus hidden, but such a plan would never be tolerated in modern practice, and is only permissible in this case owing to the relative unimportance of the Midland suburban traffic.

In certain large termini abroad and in America carriageways are carried right through the station buildings, and in Germany, in some instances, a street passes under the station roof. Such a method is infinitely more costly and infinitely more effective architecturally than our plan of a glazed roof on iron columns attached casually to the façade and destroying any merit it may happen to possess. The huge hotel at Marylebone completely blocks the station buildings proper, and so conceals the carriage-shed roof, but also has the obvious defect of rendering the approach to the station of secondary importance. The noblest approach for vehicles is probably to be found in the fine colonnades of the Grand Central Station at New York.

Where the platforms are raised considerably above the level of the adjoining streets a new difficulty arises. At Antwerp, one enters a huge central booking-hall with stairways to the concourse level. A fine interior is thus produced, but at the expense of utility, for even lifts do not meet all requirements. A sloping roadway, as at St. Pancras, is preferable, and is susceptible of an admirable treatment, as may be seen in the small but interesting reconstruction of Baker-street.

Given, then, that the carriage road should reach the booking-halls and concourse at their own level, and that the stands for vehicles should form a definite part of the structure, we must next consider the booking-halls and subsidiary offices. In America the central halls of three or four of the largest termini vie in splendour and dimensions with those in the baths of Titus or Caracalla; but there is no inherent reason why it should be so in this country, where railway stock is depreciating. Such examples as Victoria, Waterloo, Marylebone, and even St. Pancras indicate the favourite arrangement for dealing with large numbers of persons as rapidly as possible, the oval type of ticket-office being now usual. It may be remarked that improvements in electric lighting and in the manufacture of encaustic ware have greatly added to the brightness and convenience of such places.

Between booking-halls and platforms lies the concourse, an increasingly ample space from which all platforms open in a long array, usually divided therefrom by Bostwick gates and railings. At the ends of the actual tracks is the best position for bookstalls, tobacconists' and confectioners' kiosks, etc.; while the lavatories for men are now almost invariably sunk below concourse level. At the Gare de Lyon at Paris, a fine modern terminus, the concourse is not approached direct from the booking-halls, and thus the whole traffic of the station becomes congested between the two. Liverpool-street is an excellent example of the need for a concourse.

At Victoria and Waterloo, our best termini, the concourse is treated as part of the train shed as regards roofing, but a finer effect can frequently be obtained by regarding it as a separate hall, with arcaded or colonnaded entrances to the platforms. In America this is frequently done, as in several of the largest stations the tracks lie far below the street and booking-office level.

The roofing of the train shed is of considerable moment from an æsthetic point of view, and even more so from the standpoint of those who have to be responsible for its cleaning, painting, and repair. We shall never again see the beautiful latticed trusses with their Gothic curve which lend such an individuality to St. Pancras, nor the great bow-string arch which brought Charing Cross into sudden unenviable prominence a few years ago. The new system of roofing is on the ridge-and-furrow principle, comparatively low, carried on steel columns. A blank wall is frequently involved on either side of the train shed, and at Victoria (L.B.S.C.) may be seen a screen wall which is a fine, perfect architectural composition.

We have briefly indicated the chief practical requirements of a progressive railway company reconstructing any great terminus, and have shown how the tendency to simplify the planning must result in an improved opportunity for artistic expression in the grouping and details of the building. What we have omitted to say of minor practical points, such as the situation and design of waiting-rooms and subsidiary offices, or of the arrangements for dealing with luggage, does not affect the general facts.

It remains only to suggest the most practicable method of obtaining the monumental architecture appropriate to such important structures, for here it is—and here alone—that England has fallen short of modern America in station design. Is it feasible and is it desirable that architects should compete with limitations or in open field for such work, or should architecture, as well as engineering, be left entirely to the various companies' salaried surveyors? The case seems analogous to that of municipal authorities erecting public offices for themselves, yet these corporations almost invariably advertise their requirements for the benefit of all and sundry of our profession. A railway company is not (at present) a public institution, and may perhaps be more fitly compared with a great bank or insurance society. But it always pays a railway company to advertise itself in its buildings (in spite of Ruskin) as well as in posters, and a fine terminus is, even in "a nation of shopkeepers," something of a commercial asset. With all respect to the railway surveyor, we venture to suggest that in a work of such magnitude and importance he would find the collaboration of an accomplished architect of great benefit, and that the choice might be made, without much more labour than is attached to the arranging of a large town-planning scheme, or one for new Parliament buildings, by means of an ordinary public competition.

MODERN FRENCH ARCHITECTURE.

THE paper on "Modern French Architecture" which Mr. Fernand Billerey recently read before the members of the Institute is a contribution of great value and interest to a question which at the present moment is exercising the minds of the younger generation and of all those responsible for our methods of education. No longer satisfied with the results obtained by a previous generation, whose personal predilection was their only guide, the present generation of architects in this country has gradually come to realise that the most intellectual of the arts requires a basis of sound common sense, and that to express all it is capable of expressing a more definite connection between the functions of a building and its appearance should be established than has hitherto been considered necessary. Taste alone is no longer considered a sufficient guide.

It has been more generally recognised also of late years that the intellectual, social, political, and industrial upheavals of the last century, which proved so disastrous to architecture in England, did not have so serious an effect upon that of France. Indeed, nothing is more interesting than to observe that, through all the violent changes which may be said to have begun with the intellectual movement leading to the Revolution of 1789 and continued through the Napoleonic *régime*, the restoration of the Bourbon and Orleans families, the short-lived second Republic, and the reign of Napoleon III., down to the third Republic of the present day, architecture has always been able to respond to the demands made upon her, and to express with equal facility the severity of taste of the first Empire and the luxury and exuberance of the second. English architects have begun to ask themselves whether this vitality may not be due to the fact that through whatever change of sentiment or of national taste French architecture may have passed it has always possessed a solid intellectual basis, and has preserved a continuity of tradition as to its own nature and functions; which tradition has been kept alive in the schools of Paris.

In this connection our readers will be interested in the following extract which we are permitted to make from a letter bearing on this subject written in 1910 by the late R. Norman Shaw:—"I think what you have to do now is to rub in hard the necessity of developments. It was always supposed that 'Gothic' was to develop, and there was any amount of tall talk as to what it was to do; but it didn't do anything. It was like a cut flower—pretty enough to look at, but fading away before your eyes; and if we don't take care the English Renaissance that we now have will do the same. So unlike the French—they went on all the last century doing work that was founded on their old work, and magnificent work it was; and this was the result of gentle development, new features, and arrangements growing from the old stock. In fact, their architecture was alive, ours dead—a mighty difference; and arising from their having a *school*—and we have *none*."

With the exact nature of this school it is as well to be acquainted, and Mr. Billerey's paper should be of service in drawing attention to its principal characteristics. This journal has already expressed the doubt which many architects feel as to the wisdom of attempting to adopt here the educational methods of another country, which doubt appears to be shared by Professor Blomfield. But the rising generation requires something more definite than that which sufficed for the previous ones. If it cannot get it here it will seek it in France. There is no doubt that the whole question should be most seriously considered by our educational experts.

NOTES.

Admiralty Arch Improvement.

THAT a memorial to the Prime Minister signed by 293 members of Parliament, urging the completion of the Admiralty arch, and asking the Government to reconsider its decision not to contribute towards the expense, should follow the united protest made by the Editors of most of the principal London daily papers, affords further proof, if any were needed, that public opinion is unanimous on this question. As a further conference between the Office of Works, the London County Council, and the Westminster Council is to be held as a result of this memorial we may assume the truth of the statement that the Government will make a substantial contribution. This gives hopes of a final settlement of a question which has reflected no credit on the administration of the metropolis. The principle once conceded there should be no difficulty in settling details and in arriving at a proportionate amount to be paid by each authority. We notice that the memorial points out that the Government would be justified in contributing a third of the cost, and we think this amount would generally be thought reasonable. But the important thing is the principle that where improvements in London are carried out, for National purposes, on a scale not demanded by local necessities, the nation should bear its share of the extra expense.

Utilitarian Architecture.

UNDER this heading Mr. March Phillipps contributes an interesting article to the *Morning Post*, in which he deals with and describes a new elementary school built at Cambridge. We learn that these schools were designed by the Town Surveyor and his assistant, one of whom, "if not born," had "at some time in their career a brief experience of an architect's office, but their life experience had to be gathered from a constant devising and superintending of these useful, necessary expedients in regard to the housing, draining, and ventilating, of lighting, and all the thousand and one requirements of modern buildings." The schools are designed on the lines which have been made familiar to us in the admirable schools designed for the Derbyshire County Council by Mr. Widdows, the official architect for that body. That is to say, they form a quadrangle, the rooms being approached from a verandah in the inside, the classrooms thus having two external walls and being cross-lighted and ventilated. Mr. March Phillipps praises the excellent appearance of the school, and, in speaking of his visit to the Surveyor, emphasises the fact that the latter was not concerned with the production of a beautiful building, but was simply following out considerations of utility, with the result that a building has been produced which pleases and satisfies the layman more than many buildings on which architectural skill has been employed. Inferentially, we form the view that Mr. March Phillipps thinks that architects are working on wrong lines, and that the Cambridge result shows the advantage of a want of professional education. There may be much truth in the criticism that architects do not, as a rule, think enough of the logical outcome of utilitarian conditions and so, to use Mr. Phillipps' words, miss "the vigour, the flexibility, and the warmth which spring from a direct contact with life and the necessities of life"; but we do not think that the architect is confounded by his knowledge, but rather by his ignorance, and it may be want of skill. Nor do we, excellent as no doubt the Cambridge school is, find in it a revelation; it is clearly an adoption of the ideas which have been thought out by an able and experienced school architect. Had the writer first seen a school of the type in Derbyshire, we believe much that implied criticism of the exponents of our art would have been unwritten. The greatest of all progress is in architecture and planning from complexity to simplicity; but when the step has been taken the results are frequently easily adaptable by those who, without the architectural training and outlook which are criticised, could never have evolved them alone.

Earl Grey's Scheme for the Strand-Aldwych Site.

THE scheme for the utilisation of the central portion of the crescent site lying between Aldwych and the Strand with which Earl Grey is connected is an interesting one which will, we hope, come to maturity. Earl Grey is acting in the public interests in securing a site which he considers unusually suitable for public purposes with a view to give time for forming a fine general scheme in which it is hoped that the Dominions will participate. In giving evidence before the Dominions' Royal Commission, Earl Grey pointed out that it would be a very great help to both the consumer and the overseas producer if we could have a sort of Colonial Covent Garden in the form of a fine building where the various Dominions could display their produce, and where orders could be given. To bring such a project nearer solution Earl Grey has offered the County Council £3,000 a year for three years for the option of taking the site on terms to be agreed, the Council to have the right to terminate the option at the end of the first or second year. The Improvements Committee of the County Council recommend that Earl Grey shall have the right to secure the site, whose area is 124,000 ft., on a ninety-nine years' lease at a rent of £50,000 a year. It will be remembered that the rent asked previously was one of £55,000, but in view of the special character of the proposal the Improvements Committee consider the smaller sum adequate.

New Dublin Art Gallery.

A PROJECT is on foot for building an art gallery in Dublin, to which city Sir Hugh Lane has offered a collection of pictures valued at £20,000 provided that a suitable gallery is erected on or near a busy thoroughfare. The Corporation have decided to raise a loan of £22,000 if the public provide the site, and to add £3,000 to the Building Fund. The suggested site which has now been approved is a bridge site across the River Liffey, not far from O'Connell Bridge. The estimated cost of a platform across the river is only half that of any other central land site. We are glad to hear that such a proposal is likely to be acted on, the juxtaposition of buildings and water always lends itself to picturesque effects which are too often absent in our cities.

The Amateur and the Architect.

WE have at last been able to induce our amateur correspondent to give us a picture, or shall we say a grotesque representation of the architect, and we may now ask ourselves what does it all mean? Surely this, that while trying to exercise intelligence and common sense in other walks of life, our correspondent takes his impressions of architects and their work "en masse" without an effort "to read, mark, learn, and inwardly digest." We imagine in effect that he has never been in a well-designed house, or if he has it has been the last thing which has interested him. We remember an amateur who remarked to us that he could not see why an architect troubled to make drawings of doors and windows. Surely, as he put it, an indiarubber stamp which could be used over and over again would serve every purpose. We ventured to remind him that there were slight differences between the window of a small house and the west window of a cathedral. We left him thinking there were more things in heaven and earth than had been dreamed of in his philosophy, and we venture to think that the amateur transplanted into architectural surroundings will come to a similar conclusion. We should feel a special interest in having the opinion of one section of the public on architects and their works—we allude to women. We frequently read in the periodicals which are devoted to their interests, their opinions on building and decoration, but we would urge that they would have a greater chance of beneficially influencing our architects if they did us the honour to utilise the medium of our columns. Like Goethe, our prayers must be for "more light," even though the process may make some of us sadder and wiser than we were.

THE LABOUR QUESTION AND THE COMMONWEALTH OFFICES.

THE difficulties which confront mankind are largely of their own making, and many difficult positions which seem to us almost insoluble could have been settled at the outset by strength, resolution, and common sense. In private life we seldom find our fellows destitute of common sense; it is reserved for their public and collective action to exhibit the fact that they can behave as if they were entirely inaccessible to reason. In such dilemmas it is absolutely necessary to oppose to collective action based on prejudice collective action based on loyalty and reason, and such a case in point arises out of the determination of the Commonwealth Government to insist on the exclusive employment of trade unionists in their contract for the erection of their new offices in London.

The architectural profession has no reason to look with other than critical eyes on the action of the Australian Commonwealth, dominated as it is by the Labour interest.

In their competition for designs for a new capital they absolutely refused to meet the reasonable requirements of the Royal Institute, with the result that the latter body barred the competition, the first premium of which fell to an American firm and the other awards to foreign architects.

The sweet unreason of Australia did not stop here, but ended not in the adoption of the design which their own adjudicators had placed first, but in the formation of a sort of *omnium gatherum* based on several designs, and probably comprising their disadvantages; it is the story of a lost architectural opportunity.

And now the same authority, wishing to build on English soil and having to employ English labour, are bent on insisting in this case on subjecting contractors to a tyranny they have hitherto been free from and imposing Australian conditions on English soil and English enterprise.

We are not surprised at the indignant repudiation of such unreasoning tyranny by the great societies which represent contractors in this country, and we hope their attitude will meet with all sympathy and support from the architectural profession in general and the distinguished architect who is acting for the Commonwealth authorities in particular.

Weakness in such a case will merely encourage our Labour leaders to further attempts in the direction of the restriction of the individual exercise of initiative to which we as a race owe our success.

The tyranny of ignorance has always been, throughout the history of mankind, a worse evil than the tyranny of the cultivated few; even the French Revolution was an orgy of destruction until it was replaced by a military dictatorship under whose *ægis* the real foundations of liberty and equality were laid, in so far as they were compatible with the recognition of individual achievement on which real progress depends.

We have one suggestion to make in this context, which is that if the rulers of Australia dislike our labour conditions here

they should openly take the reasonable alternative and build their offices by the direct employment of labour without the interposition of a contractor. We do not envy them their task, but at least it is one which involves no conflict with our contractors or with labour interests either.

A labour organ has thrown ridicule on a former note on this head, but, wisely we think, they have concealed their own hand, probably from a just estimate of its own strength—or shall we say weakness?

AN AMATEUR ON ARCHITECTS.

IF modesty were the direct consequence of exposure to criticism, architects would be the humblest of men. And if they are not, it is no doubt partly because the habit of submitting to the easy criticism of the amateur and the Philistine is, like the payment of rent, a habit born of necessity, and partly because the architect is comfortably aware all the while that laymen in reality cast a favourable eye upon him and that in criticising him they are merely exercising one of the privileges of the ignorant, who pay, over the skilled, who are paid. The architect also knows and appreciates the readiness with which the architect-employing class, including local authorities, accepts and applauds work, however poor, of which it approves.

The amateur's right to administer not always harmless criticism to architects is based upon a tradition which arises out of the obvious facts of the situation. It is idle, therefore, for the architect to turn a deaf ear upon it. He is bound by the very nature of his profession to harken to the voice of the Philistine when he hears him complain. But the Philistine must be careful to remember what his function is. It is to criticise not out of the fulness of knowledge, but out of the wisdom that comes from ignorance. He should be a complete stranger to the technique of architecture, for therein lies the strength of his position. The dwelling-places, churches, chapels, and halls that are designed and built for him should be as things that are born, not made. The *modus operandi* is no business of his; his business is to pull to pieces the finished article.

For this purpose ignorance is no disqualification. The cuckoo cadging the sparrow's nest no doubt exercises a similar privilege; it remains to the last a capricious and captious critic of the accommodation provided, undeterred by the consciousness that, having never built a nest itself, is wholly ignorant of the difficulties and limitations incidental to the construction of nests.

As Mr. Arnold Bennett has told us, it is the proud boast of Englishmen that they know how to keep their geniuses in order. In the case of architects the efforts of Englishmen have been fairly successful. They know that in architecture genius is like a rudderless vessel in a dangerous sea. The Englishman's duty is to keep the architect straight; and he believes he is only performing a public duty in administering uninvited criticism to architects with a readiness even greater than that with which he pays their fees.

Genius, at any rate, in so far as it is an expression of personality, ought, therefore, to be suppressed as far as possible. The architect deceives himself if he believes in the value of personality for the purpose of building houses. He cannot overcome the banality of bricks and mortar; he handles an unromantic medium.

So much for genius. What can be said about architects? Architects, like all other professional men, and in particular like lawyers, imagine that they are necessary to human life. It is probable that Diogenes employed only a cooper for his dwelling-house without the assistance of so much as a quantity surveyor; and, although housing accommodation has since increased in complexity, if not in convenience, it is still an illusion cherished by the lay mind that some of the houses upon which architects have expended ingenuity and skill might have been constructed equally well without them; just as it is another cherished illusion of the layman that lawyers invent legal tangles solely in order that the layman shall call in their aid to unravel them. Even if there is nothing in either of these illusions, it is still true that custom and convention rather than indispensability keep most lawyers and architects alive. The amateur *qua* member of the public is not disposed to blame either architects or lawyers for this. If the truth be known he would not have it otherwise; but he likes occasionally to remind both of them of the true position.

But, assuming for the sake of argument the necessity for architects, it is unfortunate for them that their completed work is one of those things from which there is no escape. There it is—part of the landscape, stark to the eye of the Philistine, a permanent public monument. The man in the street who is a Philistine can ignore, as he invariably does, the indiscretions of the Post-Impressionist, but he cannot ignore the things that line his street. It is for this reason that he allows without adverse comment a far greater degree of crankiness in a picture or an opera than he will tolerate in the wares of the architect. If he likes it, it is true that he is getting something that is agreeable for nothing; but if he does not like it there is no escape—the only remedy is to remove into another neighbourhood. The comparative rarity of this motive for removing may be taken either as a testimonial to the work of architects as a whole.

Much evidence of the modern architect's mind and imagination is to be seen in certain neighbourhoods of the Garden City type, where a once abnormal and never restful type of dwelling has, by a simple process of repetition, become standardised and uneventful.

However desirable it may be to record here the views of the Philistine upon the architectural phenomena of Garden City and its more casual cousin, the Superior Suburb, one awful difficulty confronts him at the outset. By what process of divination is he to distinguish between those dwelling-places which have been conceived in the brain of an architect and those that are stamped with the mark—to the Philistine the quite invisible mark—of the speculative builder? The writer has been assured that most people prefer to live in the latter; that they deliberately shun the nobler shapes of the architected house. The Philistine, no doubt because he is a Philistine, cannot see the difference. Indeed, he thus puts upon the shoulders of the architect all the responsibility for both; and he does so because he believes that the original sin was the sin of the architect; that the speculative builder has merely wrought with ideas that first saw the light of day in some architect's office. Can architects disclaim all responsibility for the creation of the sham, half-timbered, staring white rough-cast, multi-gabled type of house that lines the highways of the Superior Suburb? In this same type there are also other features that puzzle the eye of the amateur. In particular, narrow strips of roof, for no apparent reason, dip here and there almost to the ground. Is this necessary to effect any, and, if so, what, purpose? Is it as essential to the comfort within as it is conducive to lop-sidedness without?

Apart from scornful references to this speculative builder, complaints like these often evoke the evasive generalisation that the housing of the middle classes is conducted under such conditions that they can and do prescribe for themselves. That is what they ask for, and that, therefore, is what they get. If this be true it is a confession of no small weakness in the architect.

If, from lack of technical knowledge, the amateur is an inefficient critic of the external aspect of the modern house, he may be permitted to sum up in a sentence his view of the matter. His feeling is that experiments are being tried upon him with results that are not wholly to his advantage. Except upon the experimental basis, he feels it is hard to account for some of the dwelling-places he is invited to inhabit.

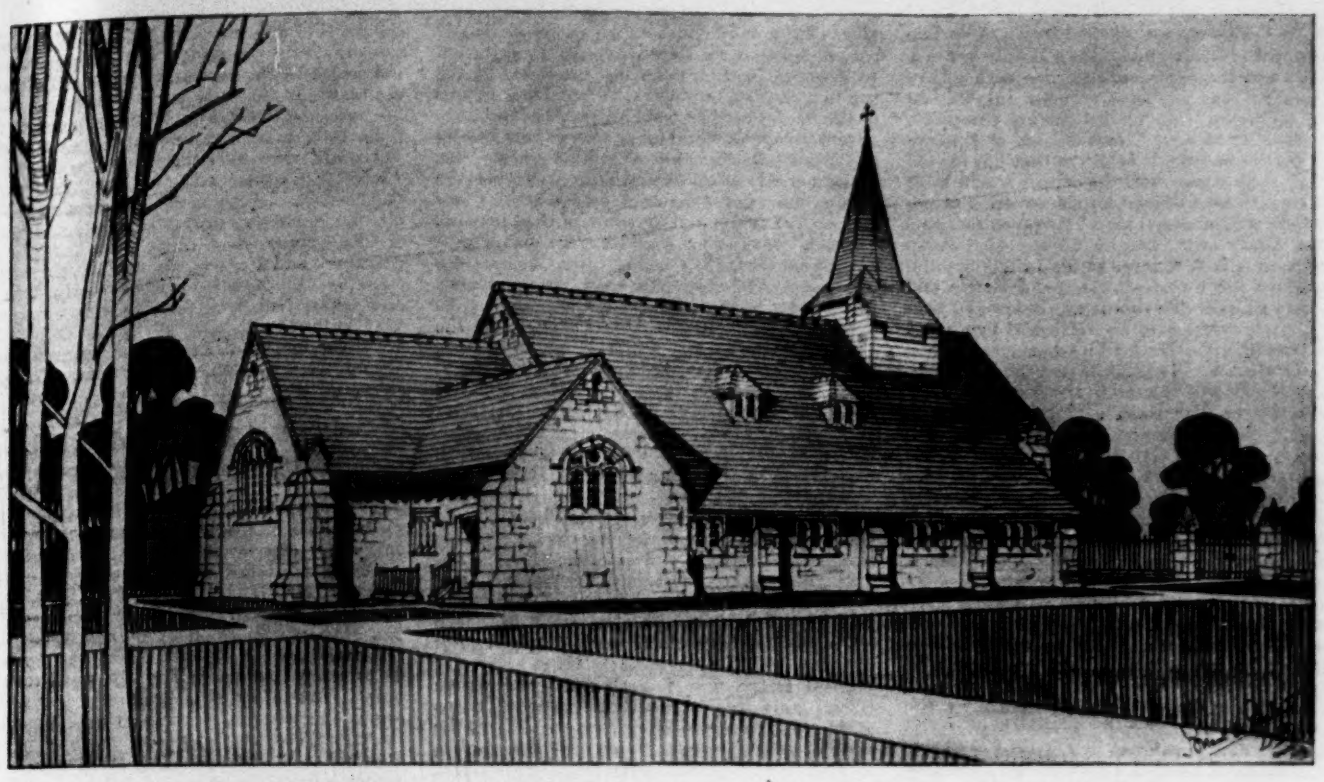
With the inside of the house, however, he flatters himself that he is competent to deal. In the first place, windows are, to the lay mind, a constant source of mischief. Architects must surely decide sooner or later what is the purpose of a window. The amateur might suppose that a window which failed to let in the light in reasonable quantities had failed in its main purpose; but certain windows known to the writer would suggest that this is not always the architect's view. Nor is it, apparently, essential that the inhabitants of the house should be able to see out of the window without getting up from their chairs.

There is nothing more loathsome to human flesh—even to the flesh of architects—than draughts. Yet how often is a fireplace so situated in a direct line between door and window that comfort ceases where ventilation begins! The amateur can hardly be expected to accept, in answer to these questions, the mere assertion, so often made, that comfort is not consistent with economy.

Again, it is the average middle-class Britisher's whim to indulge in a hot bath on Saturday night. But the architect and his henchman, the water engineer, do not always contrive to humour this peculiarly British idiosyncrasy in a satisfactory manner. It is true that in most houses provision is made for the transmission of hot water from the kitchen boiler to the bath. Yet the bath constantly fails in the hour of need. We hear in "Milestones" how the hot-water apparatus of 1860, then sprung upon an awestruck world, was severely handicapped when the cook was required to "underdo" the joint. In 1913 there are still innumerable small houses where the temperature of the bath varies with the size of the joint. These things are just those which should cost the conscientious architect many a sleepless night. So much for the internal economy of the small private house.

There are other matters which sometimes occupy the mind of the amateur. Public and semi-public buildings are not wholly lost upon him. In London he finds these not always a source of encouragement. He and the rest of the general public are accused of apathy, and blamed for the comparative tepidity of modern street architecture. He walks down Kingsway and what does he find? The new note that is to usher in a golden age? He does not see any new notes in the London Opera House. Its size is its only impressive feature. Was its designer well aware that, London being what it is, the London Opera House was bound to revert to the cinematograph palace? In Kingsway there is certainly one workmanlike building—the austere factory occupied by the Kodak Company. If there is no new note here there is also no chance of discord—nothing but a plain flat surface for the eye to rest on.

If Kingsway has yet an opportunity to justify itself, the Law Courts round the corner have established all the reputation they are ever likely to have. Here several notes are struck, resulting in a doubtful harmony. The whole scheme strikes the unskilled eye as lacking in restfulness and dignity. There are no bold lines which produce that sense of respect and fear which it is the business of the law to inspire. There are deep and highly-wrought recesses without apparent need and naked arches without apparent purpose. Justice embroidered like this suggests that the idea of the designer was to present the law's own weaknesses and not its strength. From the Strand frontage one might infer that a French Gothic church had been transposed in parts from its native



St. Andrew's Church, Frimley, Surrey: View from the North.

Messrs. H. R. & B. A. Poulter, Architects.

(Royal Academy Exhibition, 1912.)

site and re-erected, and that the parts had got mixed in the process. But this frontage is not all ecclesiastical; in the upper part there is a touch of the Norman Castle. Can it be that the round pillar-like towers that confront one another in pairs along this face of the building are intended to symbolise plaintiff and defendant confronting one another, each caught in the fabric of the law?

It is impossible to conclude without a reference to the controversy that appears to be proceeding to-day between the designers and future occupiers of certain shops in Regent-street. Into the merits of the controversy the amateur would not dare to enter. But if the architect's contention be that, although in fact a building rests upon a framework of steel, its appearance should suggest that it is supported by ponderous blocks of stone; if he thinks that too much shop-window space would render such a suggestion impossible, and that a wide expanse of window would give the impression that the houses rested on glass—then the amateur begins to feel an interest that is not without amusement. This hiding of the architectural skeleton arouses suspicions not easily quelled. Have architects failed to keep pace with the engineer? Steel construction is clearly a desirable thing from the shopkeeper's point of view. It gives him a larger window space for the same size of building. Is the architect's plea for stone that is not necessary due to a failure to adapt his style to modern requirements?

O. F. D.

ST. ANDREW'S CHURCH, FRIMLEY, SURREY.

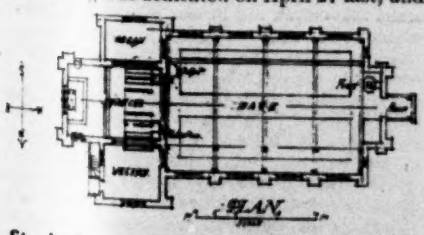
THE drawing of this church reproduced by us was exhibited last year at the Royal Academy. The building was dedicated on April 27 last, and has been erected from designs chosen in competition, half a dozen architects having been specially invited to compete. Frimley Green, in which locality the church is situated, lies in the valley of the River Blackwater, and consequently the water level was too high to permit of any work being conveniently carried out below the ground line. This necessitated the heating chamber being kept up almost at nave level.

Externally the walls have been carried out with hand-made sand faced red bricks of various shades, and stone dressings, etc. The roof is covered with dark hand-made, sand-faced tiles, made by the contractor; the spire being treated with elm boards and oak shingles.

Internally the walls have been plastered where stonework does not occur, a feature being made of the open timber roof and arcades in the nave.

The artificial light is supplied by electricity.

The general contractors were Messrs. G. Kemp & Co., of Aldershot; and Messrs. H. R. & B. A. Poulter, of Camberley, Surrey, were the architects.



St. Andrew's Church, Frimley, Surrey.

Messrs. H. R. & B. A. Poulter, Architects.

THE DOME OF ST. PAUL'S.

IT is not generally known that when it came to the selection of a suitable covering for the dome of St. Paul's Cathedral lead and copper were competitors for the choice of Wren. Many reasons were adduced in favour of the latter; for example, that it would weigh less by over "six hundred tuns." This is a very exaggerated estimate. In the light of recent knowledge, however, we can well understand how any expedient by which weight might be reduced would appeal to Wren, who alone knew how accurately his building was balanced. An argument of perhaps greater force to the citizens of London was this, that by using copper some of the dire consequences of conflagration would be averted. For when "in 1561 the lead-covered wooden spire was struck by lightning and caught fire, burning downwards, the lead flooding down in sheets of flames, threatening, but happily not damaging, the organ."

But the danger from the molten lead in the Great Fire of 1666 was even greater. Evelyn

St. Andrew's Church, Frimley, Surrey.

Messrs. H. R. & B. A. Poulter, Architects.

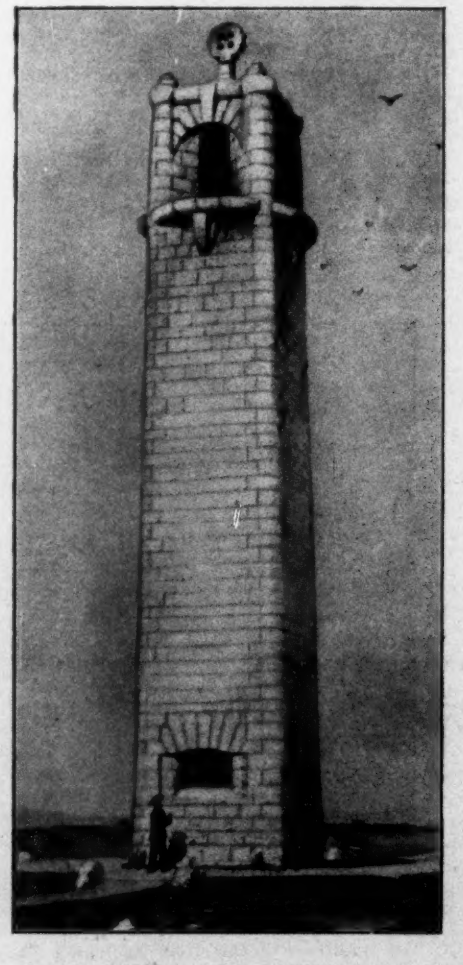
writes: "The stones of St. Paul's flew like grenades, the lead running down the streets in a stream, and the pavements glowing with a fiery redness, so that no horse or man was able to tread on them." In an interesting pamphlet, published by Messrs. Ewart & Son, of Euston-road, on this subject it is shown that but for the lack of skilled coppersmiths copper would have been used instead of lead for the covering of the dome. It was proposed then "to cover the *Dome* of St. *Paul's* with *English Copper* of Twenty Ounces to a foot square, at Two Shillings and Fourpence *per* Foot; all charge of Mettle and Workmanship." To this it was objected "that the *Copper* would soon be Black and look ugly, and that the People would by no means be pleased with it." It was allowed to this objection, "that *Copper* will Tarnish in the Air . . . but it can easily be Varnished at an inconsiderable Charge. But 'tis strange that the looks of a covering of *lead*, at such a Height, should be put into Competition with the Duration of *Copper*, which is known by Experience in Churches abroad to have lasted above Five Hundred Years without Repairing, whereas Lead will hardly lie so High, and in such a large Extent, above Fifteen or Twenty Years without needing Repairs, which cannot be done without a great Charge of Scaffolds," etc. A second objection was "that there would be several Embossments to be made in *Lead* which could not be done in *Copper*." Here the objector, whoever he was, gave himself into the hands of the Enemy, and the answer is crushing. "'Tis surprising that any Artist should urge that any Thing of that Kind can be done in *Lead* that cannot be done in as great perfection in *Copper*, as the *Pine-apple* (which is made of *English Copper*) already set up in the *West End* of St. *Paul's* does sufficiently demonstrate, in which there are much more Embossements than can easily be contrived in covering the Dome." This is very partisan, of course, for the lead of St. Paul's has lasted and weathered remarkably well.

Perhaps the real reason for the choice and use of lead is to be found in the lack of skilled workmen to manipulate the less ductile copper. The pamphlet, to which we referred above, states this at length, and it is worth quoting in full. "No workmen in England that understand to work roofing, or covering with Copper, nor any experiment being yet made. The Cathedral of St. Paul's is a building too great or considerable to make the first Experiment." Enough had already been done in the way of experiment in the construction of the dome, enough to satisfy even the curiosity of Wren.

THE EARLIEST CHRISTIAN ART IN ROME.

PROFESSOR HAVERFIELD presided over a meeting of the Society for the Promotion of Roman Studies at the Rooms of the Society of Antiquaries, Burlington House, recently, when Professor Percy Gardner gave an illustrated lecture on the earliest Christian art in Rome. He said that the time was hardly yet ripe for a comprehensive treatment of the early Christian art of Rome, but recent publications of the paintings in the catacombs was bringing them nearer to a complete appreciation of this art. All he would attempt that day was rather to raise questions than to solve them. The first point on which he insisted was the continuity between Pagan and Christian art. Art liked not the slightest vacuum, but went on from period to period. A new element came in and offered up a new interpretation, so that the old subjects were treated in a new light and with a new meaning. If they started from the well-known Pagan monuments of the early Roman age, and more especially the mural paintings of Pompeii and the sarcophagi, they would find there were two points in regard to them which were quite clear. The first was that there were a great many natural scenes; love of nature came in much more than in true Greek art. Secondly, they had mythological scenes, introduced often without any close connection with each other, which formed a sort of gallery of subjects on the walls. With the object of showing how the Christian element gradually made its way into the natural scenes Professor Gardner exhibited a number of slides of mural paintings from the catacombs, and pointed out the ways in which Bible incidents were depicted. Pagan gods were not portrayed, but there was a curious exception in the case of Orpheus, and the explanation of that was by no means easy to give. In a work of the time of Diocletian it was stated that the Christians had no objection to inserting in their paintings the figure of the sun in a chariot, or victory, or cupids, or figures of the kind, but they would not make an image of such an one as Æsculapius, who was essentially a Pagan diety. How Orpheus made his appearance it was difficult to say, but it may be that as the original tamer of wild beasts he was represented as the taming power of the Christian religion. A number of slides were also shown to indicate the curious mixing up of Old and New Testament subjects in the catacomb paintings, there being none of the later typing and anti-typing which was seen, for instance, in the windows of the Middle Ages. A great question was how the archaic type of the figures could have survived from the early period of Greek art and be repeated in the early Christian paintings and on the sarcophagi. He was not prepared to solve that question, but in treating it they must always remember that although in the great cities of Greece art proceeded in a regular evolution from its rise to its decay, and they could date the monuments closely by their style, and so forth; yet no doubt there were plenty of back-waters of art, and especially in the early Roman period there was a good deal of revival of what had been set aside as barbarous and archaic. For example, in various temples they knew the original image was a barbarous semi-human figure, and was probably a meteoric stone with the head rudely engraved. After the time of Alexander the Great that image gave way to some beautiful production of the Greek chisel. Then, again, in the early Roman age the Greek production was thrown aside and the old image was brought forward from some cellar and given the place of honour. They would be first struck by what there was *not* in these early paintings which might have been expected. History came in almost purely in symbolical fashion; there was not much representation of doctrine; a much more remarkable omission was that of eschatology; nor did they find any traces of an ecclesiastical order. But if they looked at the various types there was one characteristic common to them all—they all seemed to represent a deliverance, a salvation. In that connection it was curious to compare the early Christian paintings with certain passages in the early Christian writings, and the parallel was very close indeed. He thought also that the paintings and sculptures were influenced by the surroundings of the Christians, especialy in times of persecution: and when, for instance, they saw Daniel exposed to the lions they must also remember that the early Christians were also thrown in the lions' den. Professor Gardner said that another question which might be ventured upon was as to how far the great Sacraments of Baptism and the Lord's Supper were dwelt upon in Christian painting, and he was disposed to think that those who had hitherto written of early Christian antiquities had seen more in this connection than actually existed.

On the motion of Sir Arthur Evans a hearty vote of thanks was accorded Professor Gardner.



Stewart Memorial, Sandili Kop, S.A.
Mr. Orlando Middleton, A.R.I.B.A., Architect.

STEWART MEMORIAL TOWER, SOUTH AFRICA.

THE competition for this building, which was open to all South African architects, resulted in twenty designs being sent in, of which our illustration shows that placed first by the assessor, Mr. White Cooper, M.A., F.R.I.B.A., and since erected. The tower stands close to Dr. Stewart's grave on a kop some 500 ft. high, commanding the district round the Lovedale Missionary Institution and the small town of Alice. It is built of beautiful bluish quartzitic sandstone brought from a quarry five miles distant. The stone in the recess bears the inscription, "John Stewart, Missionary." Mr. Orlando Middleton, A.R.I.B.A., of Port Elizabeth, is the architect.

EXAMINATIONS IN SCIENCE AND TECHNOLOGY, 1912.

IN their annual report, recently issued, the Board of Education publish the Lower and Higher Examination papers set at the General Examinations in Science and Technology held by them during last year, these having been the first examinations under the reorganised system, of which particulars were announced in June, 1911. The volume also contains the reports of the Examining Committees and the papers set for competitors for scholarships, exhibitions, and studentships under the regulations for awards in science.

The general examinations were conducted by Examining Committees constituted for groups of subjects, and each Committee included at least one member actually engaged in teaching students of the class for which the examinations are intended.

In the second part of the volume will be found the reports of the Examining Committees, by whom detailed criticisms are made of the exercises worked in the various subjects. These remarks should prove most useful for guidance both to teachers and to students in connection with future examinations. We note that in more than one subject candidates have presented themselves in considerable numbers who were not sufficiently prepared to attempt the new Lower and Higher Examinations. So far as 1912 is concerned the proportion of candidates practically unable to work with success any part of the papers attempted was over 5 per cent. in the Lower Examinations and nearly 7 per cent. in the Higher Examinations.

LONDON WELLS.

WE are in receipt of an interesting memoir of the Geological Survey called "Records of London Wells," which contains a list of wells old and new with their approximate yield.

In the City, where the incidence of the water rate has induced many large concerns to bore their own wells, and where out of sixty-one wells fifty-seven are in use, it is stated that the water-level, which was 40 ft. below ordnance datum, is now between 120 ft. and 140 ft. below it. The Trafalgar-square fountains are fed from three wells below the National Gallery, which once supplied most of the public offices in Whitehall, Milbank Prison, and the Houses of Parliament, and which were completed in '47, but which now only supply the fountains. Here the water-level has sunk from 47 ft. to 195 ft. below sea-level, and a small further fall will render them useless.

It is explained that if the chalk be not fissured this is to be accounted for by a

diminished inflow, and that it is urgently necessary to raise the water-level of the London basin unless one of the finest underground reservoirs is to be practically depleted.

The geologists' proposal is to collect into a reservoir water which is at present wasted, and pour it into a dumb well sunk to the Thanet sand, from whence it would pass down to the chalk whenever opportunity offered. It is pointed out by the engineer of the Water Board that water thus introduced would be able to take its part in the general underground circulation, and that parts of the Brent Valley would be suitable for a dumb well. The subject is one of the first importance for Londoners.

BOOKS.

The English Fireplace : a History of the Development of the Chimney, Chimney-piece, and Fire-grate, with their Accessories, from the Earliest Times to the Beginning of the Nineteenth Century. By L. A. SHUFFREY. (B. T. Batsford. 1912. 4to. £2 2s. net.)

THE fireplace has for centuries provided the focal point of home-life in this country. Necessitated by very practical considerations, it has been seized upon as the most important structural feature in an apartment of almost any size and description, and designers and craftsmen have given of their best in its embellishment, knowing how persistently attention would concentrate upon any handiwork around the hearth. As ideals in matters architectural have changed, so the fireplace and its accessories have passed through various phases of design, reflecting in unmistakable manner the altered conditions of society to such an extent that, although but one member of the fabric, when studied by itself it forms a true index to the understanding of the whole.

Equipped with this volume every facility is afforded for learning all that one needs to know about the evolution of the fireplace in this country, and the various structural and decorative phases it has passed through from its first appearance almost to the present day, while the Introduction deals no less with the log fire, which was kindled in the middle of the great hall in the early mediæval house, than with the closed stove of modern days which burns anthracite coal. The change from the central "reredos," with no better provision for the escape of the smoke than that provided by the "louvre" high in the roof over it, to the side fireplace, with its continuous flue, must have been indeed welcome; but that observant writer, William Harrison, while noting that the number of fireplaces and, consequently, of chimney-stacks had vastly increased in the early part of the sixteenth century, seems to deplore the change from the hygienic standpoint when he says: "Now have we many chimnies; and yet our tenderlings complain of rheums, catarrhs and poses. Then had we nothing but reredosses; and yet our hedes did never ake." His argument was apparently that the smoke not only hardened the timber but the physique of the people also, so that what might have been an unmitigated nuisance was in reality a blessing in disguise!

By means of 130 very fine collotype plates and some 200 sketches interspersed in the text the general characteristics as well as the detail of fireplaces of all kinds are presented in a workmanlike and useful manner. Examples from kitchens are naturally treated early in the book, and those at Glastonbury, Stanton Harcourt, and Hampton Court are well illustrated, while ruined Cowdray and others might well have been added to those described; but, lavish as these are in their provision for hospitality, they cannot compare with many a Continental kitchen, such, for instance, as that of the Dukes of Burgundy at Dijon. The hooded chimneypiece which progressed to such prodigious dimensions and sculptured magnificence on the Continent likewise cannot be equalled in this country, although we boast a fine variety of this type interesting alike for their ingenious construction and for their futile inducements to the smoke to go in the right direction. In Tudor days a wide and generous treatment was favoured with very slight projection in front of the wall-face, the thick walls, or, if necessary, an external thickening, allowing of a deep recess and a flush treatment internally, giving an undoubted breadth and repose sought in vain after the introduction of the chimney-breast in later days. These pre-Renaissance fireplaces have often a singular beauty, the stonemason and the woodworker combining to provide a centrepiece the full height from floor to ceiling, full of interest, with assuredly a touch of heraldic decoration introduced somewhere, but never in any way ostentatiously or at variance with the simplicity of its surroundings. The fireplace internally, like the porch externally, attracted the foreign craftsmen as soon as they were sufficiently in evidence to make themselves felt, and some of the first signs of foreign influence are to be detected in the carving of the spandrils to the flat four-centred arches and the broad friezes above them, to be found to this day in many a house built and conceived on lines handed down by generations of native builders. Very interesting and often puzzling are these interminglings, and, although the author devotes a short chapter to the "early foreign influence," he does not by any means deal exhaustively with it. To erase a coat-of-arms or an initial on a chimneypiece and to substitute another with the addition of a date; to rework a moulding or to add a cornice were comparatively simple tasks such as successive building-owners took delight in imposing upon their carvers, often with excellent results, but not without confusion to those who in after days would read the story of the walls in which it is set.

In Elizabeth's time the chimneypiece, with its unlimited scope for decorative display, was as often as not handed over to the German or Flemish craftsman to carry out as his fancy dictated; in fact, almost any Elizabethan or Jacobean house shows the hand of the foreigner in its chimneypieces, if not in the actual execution, certainly in the manner of design. Some are characterised by vigour and genuine originality, and the general effect is sumptuous and magnificent, but the detail more often than not is coarse and ridiculous, and the repetition of the same trick of design wearisome. Even in this book it is a relief to turn away from the fulsome exuberance of many of the examples of this period to the reticent and well-ordered designs of the seventeenth and eighteenth centuries. Many of the fireplaces by Inigo Jones and Wren and their successors here portrayed are delightful, and our only regret is that there are not more of them. The design of the chimneypiece had by that time become a serious undertaking, calling for a certain amount of scholarly knowledge. Many books were published by architects and cabinet-makers containing, amongst other things, designs for chimneypieces on classic lines, some of which were generally accepted, and were at the worst preferable to the designs inspired by the German and Flemish pattern-books of earlier times.

With the brothers Adam a new field was opened out and a purer classic taste was fostered; while, as the author says, when they were assisted by Pergolesi they gave to the treatment of marble in chimneypieces a refinement in decorative detail which had not been previously seen in this country. And so the story is told page by page, with excursions into the questions of firebacks, grates, fenders, and, in fact, everything connected with the fireplace, even to the "dog-wheel," which, though now rarely found *in situ*, at one time figured beside innumerable kitchen fireplaces. It is an attractive book, and should appeal to all who are in the least interested in the evolution of the English house and its equipment, while it is of great value to the architect, for it is the first serious work to appear which is devoted from cover to cover to a subject that will always command attention in this country. Unlike Continental and American peoples, we have never been content, and presumably never will be content, to furnish our homes with closed stoves, which, however satisfactorily they may give out the warmth we require, fail completely to do it in the cheerful and companionable way that is the special province of the open fireplace.

The Mediæval Architecture of England. By CHARLES HERBERT MOORE. (New York: The Macmillan Co. 1912. Price 15s.)

ROMAN architecture once enjoyed the reputation of an evolution largely independent of outside influences. Modern criticism does not uphold this view. As we read in Mr. Lethaby's admirable little text-book, "Rome entered into the traditions of this Hellenistic art; in fact, Roman art was one of its branches." In like manner, it is but reasonable to consider the style derived from the Romanesque, which first displayed its possibilities in the Ile de France, as Gothic architecture, whatever be the characteristics stamped upon it, by those various nationalities which employed it.

Yet we find Mr. C. H. Moore arriving at the retrograde conclusion that the difference between English Church architecture and contemporaneous French architecture "is so great and fundamental that the two styles cannot be ranged in the same category on any right principles of classification." He would restrict the use of the term Gothic to the French art, and find for the other continental examples of pointed architecture, some more distinctive name.

Gothic architecture is, in the author's opinion, a matter of scientific construction, a system of thrust, support, and counterpoise, and this system he finds logically carried out in the Ile de France alone. He defines the system as "an organic skeleton, without walls, supporting stone vaulting." English Gothic, it is maintained, does not represent this. Its motive is æsthetic rather than structural. That there may exist two opinions as to the amount of inspiration drawn from French sources, we can well conceive. On the one hand, it is not unusual to find English Gothic described as an offshoot from the parent stock of France; while the influence exerted by William of Sens at Canterbury, or the Cistercians at Westminster, may be noticed, so it is urged, in all subsequent examples. On the other hand, there are those who would greatly restrict this influence, and grant to English mediæval architecture a much larger sphere of independent development. But Mr. Moore seems to us to be both running with the hare and hunting with the hounds. He sees French influence everywhere present, while he at the same time, insists that some new and strange style was evolved from the Norman Romanesque, for which he can find no name.

The National Insurance Act, 1911. By ORME CLARKE, Barrister-at-Law, with an Introduction by SIR JOHN SIMON, K.C.V.O., M.P., Solicitor General. Second edition. (London: Butterworth & Co. 1913. Pp. 571. 12s. 6d.)

THE first edition of this work was published immediately after the Act had received the Royal assent, and more than six months before the Act in any sense came into operation. Under the Act contributions became payable on July 15, 1912, but the benefits have only become due, with the exception of sanatorium benefit, within the last few months. In his preface to the first edition the author expressed the hope that the provisions of the Act which he endeavoured to elucidate might prove of "pleasant interest" to nearly all the inhabitants of the United Kingdom, but he admitted that the details of the measure were extremely complicated. If the subject was complicated at the time the author penned this first preface, what is the case now? In the preface to this second edition Mr. Clarke says that anyone who read the Act must have realised that it was in many respects a skeleton, and that an immense amount of detail was left to be filled in by regulations, and in the volume before us these regulations, orders, etc., occupy close on 100 pages of small type. When Sir John Simon in his introduction to the first edition light-heartedly said that to express a well-founded opinion on the Act not less time and trouble must be devoted to studying it than a lady would devote to choosing a new dress or a man in selecting a new motor-car, the impression cannot be dismissed that possibly he had not studied the Act more than his motor-car, and consequently failed to realise its complexity. The modern system of producing Acts of Parliament in skeleton form, leaving all the details to be filled in by orders or departmental regulations, is extremely inconvenient in practice. The Insurance Act has been in force over a year, but new regulations have been issued nearly weekly, and thus in a sense its provisions alter from day to day, and this mass of regulations and orders are extremely difficult to collate and master. Had the author of the present volume done nothing besides collecting all these regulations under one cover he would have performed a useful service, but, as he says in his preface, he has done more than that, and he has revised the whole text and made numerous additions.

The work consists of an introductory summary followed by the text of the Act with notes and cross-references. The regulations,

orders, etc., which are, of course, a new feature, are contained in the appendix, and another addition is a digest of the cases decided by the Insurance Commissioners, which, so far as the author has been able to ascertain, have not been appealed against. There is also an index, which, however, in future editions might be somewhat amplified with advantage.

We find no reference to a case which was heard in the West London Police Court in November in which a claim for damages was disallowed for the detention of an insurance book, and which we noted November 15, but otherwise we find the recent decisions noted with clearness and accuracy, and the text has been very carefully revised and brought up to date. Those who have used the first edition of this work and are acquainted with its merits will welcome this further edition brought up to date, whilst to those who have not yet purchased it it can be recommended as a thoroughly reliable and comprehensive text-book, treating with clearness and accuracy an unusually complicated subject.

ANGLO-SAXON ARCHITECTURE.

FOURTH LECTURE.

On March 3 Professor Baldwin Brown delivered the last of his lectures on Anglo-Saxon architecture, and dealt with the evolution of the cruciform plan and the relation to this evolution of the side chapel and side porch and also with the development of the tower and the relationship of the tower to the rest of the ecclesiastical structure. The normal development in Europe was that the cruciform plan developed out of what was called the *crux commissa* plan, which was a T-shaped plan in which the T had no fourth arm to it. In England the development seemed to have been quite different. They had such a planning in the earlier church at Peterborough, but that did not appear to have influenced the cruciform plan generally in this country. It was rather evolved by certain experiments with the placing of the lateral chapel or lateral porch. The origin and use of the tower, as a whole, was one of the unsolved problems of Christian archæology. They did not know when the first towers were built, but it was clear that the purposes for which towers were used in later mediæval times were not those for which they had originated. It could not have been for hanging bells, because when towers were first introduced bells were not sufficiently large and heavy to require such a structure. They knew that in comparatively early times towers were used as places of refuge and defence, but there was one early use of the tower which was of the greatest significance in regard to the Anglo-Saxon tower, and this was to provide an access to the upper gallery by means of stairs. At San Vitale, at Ravenna, they saw on either side of the entrance portal half-round turrets containing the steps which led to the upper gallery, which was always a feature from the first with those domed or circular churches. At the west front of the Minster of Charles the Great, at Aachen, modelled very much on San Vitale, they got the same thing. From this arrangement of the fore building flanked by turrets they easily developed the twin tower façade and the single western tower. With the object of tracing the evolution of the cruciform form in Saxon architecture from the modification of the arrangement of the lateral chapel, the lecturer drew attention to the entrance porch of Bishopstone Church, where the doorway is not in the middle but to the west of the porch, the explanation of this being that an altar was placed against the east wall. Many of the churches had altars in the entrance porch and the side chapel. The best building in the country in which to study the Anglo-Saxon lateral porch was the church at Bradford-on-Avon. This church showed the lateral porch very much developed, because the space within the two lateral porches was two-thirds of the whole space of the nave of the church. The porches were not at the western end, but were about the middle of the distance along from west to east. At Brixworth and Monk-Wearmouth they had seen that the tower was built on the walls of the pre-existing porch of entrance, and the same thing was done in the case of the old Anglo-Saxon cathedral at Canterbury. The point was that later on lateral towers were erected upon these porches, and that the later Anglo-Saxon cathedral had two towers flanking the nave built on pre-existing porches. At the church at Breamore, Hants, they had a central tower, which hardly seemed to have made up its mind whether it was to be a tower or not; and at Dunham Magna, Norfolk, they had a similar tower growing out of the nave. At Breamore the walls of the tower were no thicker than those of the nave, but at Dunham Magna the builders seemed to realise the conditions of tower building, and where the tower came the walls were thickened on the interior side, but there was no indication at the lower part of the wall where the nave ended and the tower began. These instances showed the Anglo-Saxon builder feeling his way towards architectural expression. The most complete cruciform church of Saxon times which was left was that at Worth, but the tower was later. He fixed the date at the later part of the tenth century, for one criterion which could be applied for fixing this period was the use of the baluster shaft. They had the full development of the cruciform church at Stow, Lincolnshire. They had in the slides shown seen the varying positions of the tower. Some were at the western end of the building, in which case they were narrower than the nave, and some occupied a position which he was inclined to call axial. They found them also at the crossing, as in the case of Breamore, Dover, and Dunham Magna; and they could also find them at the east end over what was called the presbytery or chancel. But the most interesting phase of tower development in Anglo-Saxon England was shown by those churches in which the ground story of the tower was the real church. A typical example was that of Barton-on-the-Humber, and one of the earliest and most interesting towers in England was that of Brixworth, built on the walls of the pre-existing western porch, apparently to gain access to the upper story above the porch Professor Baldwin Brown went at some length into historical considerations to account for the purpose of this upper chamber, so common in Anglo-Saxon churches, and expressed the opinion that it was inhabited by the sacristan, who used the "squints," which were sometimes found in the chamber, for keeping an eye on the altar and relics and so on, in the church. He next dealt with the question of the ending of the tower, and showed that at Sompting, Sussex, they got that termination so familiar to those who travelled in Germany, and which we knew as the German "Helm." Continuing, he said that most of the phenomena of Anglo-Saxon architecture had been passed under review. They had considered the planning with square ends and apsidal, transepts, the basilican and single-aisle scheme, with crypt, porch entrance, side chapels, and, finally, the tower as it had developed in relation to the other parts of the ecclesiastical structure. Notice had been taken also of the form and arrangement of the door and window openings as well as of the characteristic details, such as quoins, pilaster strips, belfry-shafts, and through stones; and a passing glance had been thrown at questions of materials and technique. In conclusion, a few sentences might be devoted to a *résumé* of the chief points in the general history of the style. With materials and in a technique which was in great part Roman, but showed some Celtic peculiarities, the Anglo-Saxon builders of the seventh and eighth centuries erected the cathedral, monastic, and village churches, some of which he had passed under review; but these from the first claimed a certain originality as well in planning as in technique and enrichment, and seemed to exhibit also a carefulness in treatment, and at the same time an imposingness in scale which made it plain that the builders of the epoch were inspired by ambitious ideas and were most probably endeavouring to rival some of the already famous churches in Gaul. With the Viking inroads, however, architecture received a check, and, although many of the destroyed churches were rebuilt, yet the consciousness that they might be again destroyed must have deprived the builders of encouragement to carry out such restorations in a careful and ambitious manner. Notwithstanding this, they must not assume that during this second or Danish period architecture came to a standstill, for, as they had seen, the especially Saxon feature of the long and short quoins must have been developed in this epoch. The third period was characterised by the building activity which marked the reign of King Edgar from 957 to 975. The most reasonable explanation of architecture of this period seemed to be that when the fresh activity began the English builders of the time were somewhat perplexed as to the methods which could be best employed to give architectonic character to their structures, and they turned to the other side of the North Sea, with which their own country had for a long time stood in a somewhat close political relationship. The western tower was an Austrasian form, especially common in Westphalia, and this was taken over into English architecture. Many of these towns probably ended with the German helm. With this special feature of planning certain decorative details were also adopted, the most curious of these being the pilaster strip, whilst the double-splayed window came also with it. So soon as towers became common, and their method of belfry openings required subdivision, there came the through stone supported by the mid-wall shaft, which the Germans had previously borrowed from Italy. At first there were baluster shafts, but later they used simple shafts which required capitals for their proper finishing, and the cubical cap generally chosen was another loan from across the German Ocean. It would, however, be an error to regard the Anglo-Saxon builders of this period as mere imitators. They preserved throughout an idea of originality and independence in matters of planning and in features of detail. The tower was disposed in many different positions, and there was a remarkable type of church in which the lowest story of the tower was the chief space of the interior. The cruciform plan was in some instances, through a remarkable development, gradually evolved out of the porch and lateral chapel, and the most ambitious and interesting buildings of the third period might on good grounds be ascribed to the last half of the tenth century, while other interesting buildings were built in the times of Canute and Edward the Confessor. The latest phase of Anglo-Saxon architecture seemed to be marked by the square western tower of the so-called Lincolnshire type, and they found in this that certain special characteristics of the Anglo-Saxon style had been dropped, such as the long and short quoins. The windows were single-splayed, and as a rule were tall and narrow, and did not differ from contemporary windows in Norman architecture. These windows were, however, the only feature in which the latest Anglo-Saxon work resembled Norman. The single western tower in itself was not a Norman characteristic, and occurred indeed seldom in the Duchy. The western tower, the cubical cap, and some other features were taken over by the Norman builders, and the western tower had remained an English characteristic through all their architectural history. This made Anglo-Saxon architecture still, to some extent, a living thing, and, in any case, these remote forefathers of their "Scotts" and "Streets" had left specimens of their devising and construction which offered material for study of considerable complexity and interest.

GENERAL NEWS.

Professional Announcement.

Mr. Henry T. Hare has removed his offices from No. 13, Hart-street, Bloomsbury, to 7, Gray's Inn-square, W.C.

Spanish and Portuguese Jews' Hospital, Mile End, E.

Mr. Manuel Nunes Costello, A.R.I.B.A., has acted as honorary architect in the preparation of the plans for the rebuilding of the Beth Holim in Mile End-road, E., at a total cost of about £10,000. The contract for £8,860 has been given to Mr. W. J. Maddison. The original hospital, on the present site, was established in 1665; the structure has latterly served as a home for the aged and infirm.

Ruskin College, Oxford.

A few years ago Messrs. Joseph & Smithem's plans and designs were accepted for the rebuilding of the then Ruskin Hall, on the corner site in Worcester-place and Walton-street, adjoining the gardens of Worcester College. Subsequent events affecting the reconstitution of Ruskin College delayed the project. Under the new scheme of reorganisation the funds have proved enough to begin with an instalment in the form of the wing, for about fifty students, that was recently opened. The block comprises the principal's lodgings; on the ground floor is the Buxton Memorial Hall, which has a capacity for 250 persons, and can be subdivided by sliding partitions into two lecture-rooms; the students' rooms are on the upper three floors. The building is of red brick with stone dressings, and adjoins the present house.

The Devonshire Club, St. James's-street.

The club committee are resolved to effect considerable alterations and improvements, at an estimated cost of some £7,000, of the club-house in St. James's-street, to include more bedrooms, a large billiard-room, artesian well, a further installation of electrical lighting, etc. The present premises are closely associated with the adventurous career of John Crockford, for whom they were erected in 1826–7 by Benjamin Dean Wyatt and Philip Wyatt. In 1849–51 it was the house of the Military, Naval, and Civil Service Club; it was subsequently converted into the Wellington Dining-rooms, and then was used as an auction mart, and afterwards was taken by the Gryphin Club. About thirty-five years ago C. J. Phipps remodelled the interior for the Devonshire Club, as newly established, under the presidency of the then Marquis of Hartington, the late Duke of Devonshire.

Coal Smoke Abatement.

A committee of which Dr. W. N. Shaw, F.R.S., Director of the Meteorological Office, is President, of delegates convened in March last by the Coal Smoke Abatement Society, were appointed "to draw up details of a standard soot and dust measurement apparatus and methods of its use." The committee have adopted a method of investigation used in the inquiry instituted in 1911–12, under the auspices of the *Lancet*, to ascertain the degree of pollution of the atmosphere in and around London. The standard apparatus which they recommend consists of an enlarged rain gauge having a catchment area of 4 sq. ft., which deposits all that falls therein into a large bottle for regular analysis. Many of our chief provincial towns have agreed to use the apparatus, and an examination of the reports will, it is anticipated, afford valuable evidence of the degree of the pollution, or purity, of the air in various thickly-populated districts.

The Cockburn Association.

We could wish more power to the elbow of all such public bodies as the Cockburn Association, founded for the preservation of the amenities of Edinburgh and its neighbourhood. From a recent report of its thirty-sixth annual meeting we gather that the total number of members is now 229, but that the attendance at the meeting did not reach double figures. Considering that Edinburgh is one of the most beautiful towns in the three kingdoms, and that, as the capital city, it is the centre of the culture of Scotland, it might be expected that the aims and objects of the Cockburn Association would make a wider appeal and obtain far greater support among all those who value its amenities and traditions.

Church Building Society.

The Incorporated Church Building Society held its usual monthly meeting on the 20th inst. at the Society's House, 7, Dean's-yard, Westminster Abbey, S.W., Mr. Athelstan Riley in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Brough, St. John, Yorks, £50 for the first portion; Barnfield, St. Paul, Lancs, £150 for the first portion; and Goodwick, St. Peter, Pembrokeshire, £150 for the first portion; and towards enlarging or otherwise improving the accommodation in the churches at Battersea, St. George, Surrey, £30; Inwardleigh, Devon, £10; Morecambe, St. Barnabas, Lancs, £50; Old Street, St. Mark, Middlesex, £50; and Stretton-on-Dunsmore, All Saints, Rugby, £25. A grant of £15 was also made from the Special Mission Buildings Fund towards enlarging the Mission Church of St. Paul, Crofton, Orpington, Kent. The following grants were also paid for works completed:—Old Ford, St. Paul, Middlesex, £50; Thorpe-on-the-Hill, St. Michael and All Angels, Lincoln, £60; Lydbrook, the Holy Jesus, Gloucester, £25; Groombridge, St. John, Kent, £20; Wembley Park, St. Augustine, Middlesex, £30; and Heathfield, St. Richard, Sussex, £25. In addition to this the sum of £247 was paid towards the repairs of twenty-seven churches from trust funds held by the Society.

Statues for the Maidan, Calcutta.

Soon will be unveiled the statue of Lord Curzon which has been executed by Mr. H. Thornycroft, R.A. The composition embodies a central figure on a platform 40 ft. square, having at the angles groups of "Peace," "Commerce," "Agriculture," and "Famine Relief"—all in bronze, with bas-reliefs, in the masonry of the plinth of the central pedestal, representing the Delhi Durbar, Taj Mahal, Queen Victoria Memorial Hall, Calcutta, and the Mounted Corps of young Indian princes. The equestrian statue of Lord Minto, to be erected out of the Lord Minto Memorial Fund, will be entrusted to Sir W. Goscombe John, R.A.

CORRESPONDENCE.

Royal Academy Lecture on Sculpture.

SIR,—I believe, Sir, that those who were present at my two lectures at the Royal Academy will bear me out when I say that most of the views opposed to my own contained in your interesting article were emphatically supported in my lectures, even the warning against following the example of Canova and his school. I warned my hearers, as I did in the same place many years before (of which lectures you at the time gave a full report), against confusing "classicism" with the living naturalistic art of the ancient Greeks, against the mere copying of definite models and the limitation of the sculptor's art to what you, Sir, and others call mere "prettiness." I even avoided, as far as possible, the use of the term "beauty," as being complex and misleading, and generally substituted the term "harmony" for it. Important as the establishment of formal harmony of line, mass, and colour is, and will always remain, in the graphic and plastic arts (as harmony of sound and versification will always remain an important part of lyrical poetry, though not its only aim), there are much wider spheres of harmony into which these arts have in the past extended and will do so in the future. But this harmony also includes the harmony between the artistic vehicle and the subject chosen for presentation; a subject fitted to one art might not be suited to another. It is on this ground that I maintain that "La Vieille Heaulmiere" by Rodin is an artistic mistake. Villon's poem is a beautiful work of art and conveys the artistic idea adequately, even with tragic impressiveness; but the bronze statue is merely the representation of a repulsive subject. To convey the idea of the poet by means of the statue, each spectator would have to be presented with a copy of the poem while standing before the work, and even then it would not convey adequately the stirring tragedy. I maintained that in the representations of the Pietà, the Raising of Lazarus, the School of Anatomy by Rembrandt, and numberless other works of the same category, the diseased body, or the corpse, was subordinated to a wider artistic idea and therefore lost the undoubted elements of repulsion which every normal man feels, and naturally feels, and that this repulsion was not an element directly to be aimed at in art. When in answer to my thesis it is said, "But who is to decide that an artist has no great idea in his art merely because he does not give it a familiar title? So far as we can talk of ideas in art at all, they are quite independent of titles. . . ."—my answer is that the works of art I have mentioned need no title. The figures surrounding the corpse, the clear action and the idea conveyed by the whole composition tell the whole story completely. The corpse forms an essential part of the story, but it is subordinated to it to such a degree that what would form elements of repulsion in actual life are raised by the purely artistic quality of the work of the great composition into a wider sphere which clearly belongs to the domain of art, not requiring the introduction of any extraneous supports. M. Rodin's work requires not only a title, but even the reading of a poem conveying a very complicated situation.

In my lectures I chiefly opposed what I should like to call "The Doctrine of Artistic Equivalence in Nature and Life." We are constantly told that Nature is always beautiful. This I should like to answer by a question: Which Nature? If Nature presents us with the individual, she has also established the "type," and she is constantly enacting the drama, perhaps the tragedy, of the survival of the fittest. This applies not only to things and beings in nature, but also to movements and situations. The actual rendering of an individual movement by an individual model, however true it may be, fails from the point of view of the movement itself, as no man or no horse moves or jumps in the same way. If the artist is to choose anything and everything in nature and life for presentation in his work, art is merely a recording machine or a makeshift for reminding us of what we cannot conveniently see before us, and even then actual observation will beat art every time, and there really is no use for her. You need not fear, Sir, that I shall give you the whole of my lectures on these very subtle and difficult questions. But you wrong me when you imply that I wish to limit the choice of the artist's subjects to objects of "prettiness," or to what is patently and glaringly called beautiful, noble, or virtuous in life. I told my hearers that there might be more artistic soul in the presentation of a pugilist than in the statue of the Angel of Death with marble tears carrying a dead infant in her arms. I even ventured to maintain that a novel which deals artistically with the life of a servant may be nobler and of higher art than one which records the life of kings and princes. But I warned them against making a whole school of servant novels and turning their back on more interesting spheres of life which, to say the least, are also part of nature and general life. I especially warned them, and I wish to repeat it now, against turning their backs on the study and the presentation of what is normal in nature and in life, though art need not be restricted to such definite presentations. And when it is said, "It is probable that many eager young artists avoid the reproduction of obviously beautiful things from an ascetic timidity," I should like to answer: *ça explique mais ça n'excuse pas.* At all events, for students (and, remember, I was addressing them) it is important to remind them that the study of physiology must precede the study of pathology, especially in art; that they must learn to draw and model accurately; that they must learn through Nature what she has established in the normal realisation of life and movement; and that in all these respects the spirit of Greek art and the principles which it embodies in its sculpture (much wider than the mere idea of "prettiness") will be their best guide during a certain phase of their studies. In learning to write we must first endeavour to fashion the letters as they have been established (and are therefore legible), and in doing this in the course of time our individual character in handwriting will naturally develop itself. The actor and the dancer must learn proper elocution, enunciation, the use of the voice, gesture, and movement in their most normal forms, and then they can, as occasion arises, vary this accent, even mispronounce words, and give awkward gestures and movements to suit the character they are impersonating. So in modelling, however wide you may make the sphere of subjects for artistic presentation, beauty, direct and immediate, will always form an integral element, and the student will do well to fill his soul with it, in order that he may at times turn his back upon formal beauty to realise in his work a higher spiritual aspect of the harmony of things. The leader-writer in the *Times* has cited music from the lips of Michelangelo. No better instance for the fundamental principles of all arts could have been chosen. However much music may become imitative of definite life and occasionally even introduce dissonance, as an art it will always rest on the harmony of tones. Looking as far ahead into the future as you like, I doubt whether it will ever develop into that form where it strives to render truthfully the noises of Piccadilly in the height of the season. If it does, the gramophone will be a better vehicle for doing this than the elaborate composition of the greatest futurist composer, seconded by a futurist orchestra, with elaborate instruments that convey every possible sound in the growing cacophony of modern life.

CHARLES WALDSTEIN.

P.S.—At my first lecture I exhibited a number of illustrations of remarkable statues by M. Rodin, for whose best work I have the most intense admiration. While dwelling on their great qualities I warned young students against merely imitating him when he left the marble unfinished, which, in his case, nearly always had a deep artistic significance and justification.

The Shortcomings of Competition Assessors.

SIR,—Architects are constantly complaining (and justly) of the shortcomings of the promoters of competitions; but they have even greater cause for complaint of the assessors, and sometimes of the want of judgment in the President of the Institute for the time being in his selection of them.

To take the latter point first. It is obvious that the President, when nominating an

assessor, should name not only a good architect, but one whom he *knows* to be an expert in the kind of building to be judged, and, lastly, and most important of all, one whom he knows to possess a judicial mind. Unfortunately, many very good architects do not possess this.

It should not be any question of "Whose turn is it?" but manifest fitness in every sense should be the sole qualification for nomination.

Some architects appointed by the President during the last few years, while recognised by all as most able and fair-minded men, have proved their absolute incapacity for the task imposed upon them.

No one can better judge the designs in a competition than the competitors themselves, for they know every condition and every difficulty by heart, and most of them can judge very well whether the award is good or bad.

Assessors do not always appear to study the conditions of a competition with sufficient care, nor the questions by competitors with the answers to the same. All these together govern the whole matter, and the award should be absolutely and solely governed by them.

One frequently sees an award in favour of a design which is obviously not what the promoters want, and which does not conform to the spirit of the conditions, but the assessor likes the external design, and apparently the rest does not seem to matter to him.

Again, the manner in which the second, third, and fourth places are allotted would seem to sometimes indicate that the numbers of all the designs are put into a hat and then drawn at random for the respective places.

How often does one see a design placed second or third which could not possibly be carried out within 50 per cent. of the stipulated sum, or which is obviously in violation of one or more of the conditions! And yet it gets placed, notwithstanding. A really just and competent assessor would at once disqualify such a design at the very commencement of his examination.

The result of the competition for the Cardiff Fire Station was probably a great surprise to most of the competitors. The successful design had some most glaring faults, and was, in some most important points, in direct opposition to the evident intention and desire of the Corporation. In your criticism of the designs on October 4, 1912, you remarked that none of those placed after the first would have proved a satisfactory solution of the problem.

The assessor in this matter was a most able architect, but did he know anything about fire stations, and did he make his award upon the basis of what the Corporation said they wanted, and upon the basis of their answers to questions? There are several good men who have carried out similar buildings, and surely it would have been better to have nominated one of them as assessor.

The award in the competition for the Harrow Municipal Buildings was equally unsatisfactory. The assessor (also a well-known and clever architect) appeared to have a most elementary idea of what constituted good planning for such a building.

The designs placed first and second had many bad points, and that placed third had a massive stone front with heavy columns, which would have cost to execute a very considerable part of the whole sum provided for the building. One of the designs, which was either premiated or commended, had a *strong*-room with 14-in. walls and two external windows! Is it possible to divine upon what principle such designs could be placed or commended?

There were some designs in this competition which were much better than any of those which were placed by the assessor.

In the face of such awards one feels that the gambling incidental to all competitions is increased tenfold by the possible unfitness of the assessor.

Do not take this letter as the growl of a disappointed competitor. Every competent architect knows very well when he is beaten, and takes his beating with a good grace and in a sportsmanlike manner.

It is hard, however, when one has made what he knows to be a good design, to find inferior designs placed above it, and which frequently have defied the conditions, and have ignored the desires of the promoters as expressed in them. That this is not an infrequent event your own pages and illustrations constantly testify.

The remedies which I suggest are as follows:—

(1) That no architect should be appointed as an assessor who has not himself carried out a similar building to that which he is appointed to assess.

(2) That he should most carefully study the conditions, *and also the questions and the answers thereto*, and thus clearly make up his mind as to what the promoters want, and not what he thinks that they ought to want. He should remember that it is upon *the conditions* that the competitors have designed their scheme, and, in common justice, he should decide upon that basis only.

(3) He should at once put out of consideration all designs which do not in all essential particulars comply with the conditions, be they never so clever or attractive.

(4) He should then proceed to choose a design for the first place by a process of elimination, namely, by taking any two designs and deciding which of them is the better, and then taking another and comparing it with the best of the two last, and so on to the end.

(5) With regard to those which are to be placed for premiums or honourable mention, the design placed second should be that which the assessor would have placed first, supposing that the latter had not been sent in, and similarly for the third and other places. It is only common justice that these designs should have their fair places, and be selected with the same strict honesty as that by which that placed first should be selected, but how very seldom is this the case!

That an assessor should be and act as above suggested will seem to most architects to be so obvious as to need no statement; but the fact remains that, with the best intentions, many assessors fall very far short of the above standard.

The cleverest and best-known architects do not always make the best assessors. A reasonable competence, the possession of the critical faculty, great patience, and, above all things, *a judicial mind*, are the essential qualifications for a good assessor. Such a man will seldom fail to find the best design out of any number sent in.

I have heard the most extraordinary stories of well-known men assessing a large and very important competition in a day. I hope that they are not true, but I am afraid that, in some cases, they are. Such haste is obviously dishonest, and wrongs both the promoters and the competitors.

Assessors receive good fees, and they ought to make it a point of honour to see that every brother architect whose work they judge gets the fullest justice.

Speaking from personal experience, I know that all the time that one can spare or make for a week, a fortnight, or more, according to the nature of the building and the number of the designs, must be spent upon the matter before justice can be done to it and to the competitors.

Nowadays, no members of the Institute compete (or they should not) unless there is an assessor; but they are only going from Scylla to Charybdis when the assessor does not possess all the necessary qualifications, and when he does not execute his duty with the most strict conscientiousness to *all* the competitors.

W. GILLBEE SCOTT, F.R.I.B.A.

Indifferent Quantities.

SIR,—For bad or indifferent quantities, no matter by whom prepared, there can be no excuse; but there are several potent reasons why architects should prefer to have their quantities taken off in their own offices. To begin with, no man is so well qualified to know exactly what is required at each point in the building as he who has designed it. He only can have the complete knowledge of his own intentions that will secure the greatest accuracy in regard to details and utmost economy in execution.

The taking off of the quantities, for which a very detailed knowledge of construction is required, gives the architect a thorough grip of the building and enables him to superintend its erection with a thoroughness which otherwise is impossible. It places him in a position of authority upon whatever questions may arise, especially such as concerns alterations and additions, etc.

He is able to deal direct with the contractor upon points of relative costs without the intervention of a third party. Still more is this the case in dealing with the client. For with him the architect will be able to discuss the financial and business side of the undertaking; preparing with facility alternative estimates for different schemes, and pointing out the increase or decrease in expenditure resulting from suggested substitutions or alterations. He is thus able to gain the confidence of his client in a way that would be impossible for an architect who has always to be referring to his firm of surveyors and who may in fact be afraid to meet his client to talk such matters over without their assistance.

I do not want to belittle the profession of quantity surveying, but I must raise an objection to the suggestion that a whole lifetime is needed to master it. We are told that it is impossible to be both an architect and quantity surveyor, that our artistic training as architects necessarily incapacitates us for acquiring the requisite knowledge for quantity surveying.

Is art so brain-destroying as that?

I think, too, that I see smiles on the faces of our artist friends at the thought of the "artistic training" of even the best of us.

We must be of poor stuff indeed if we cannot acquire the knowledge necessary to translate our ideas into reality and see our jobs through from end to end.

It is hard to find anyone with confidence in us nowadays, and I believe that is through the neglect of the architect to master practical details of construction, a knowledge of prices, and the practice of quantity surveying, etc., that we cut such a ludicrous figure in the eyes of the public.

The lack of artistic feeling in nine-tenths of our modern buildings is patent. If now we are to curtail or restrict our practical knowledge to the same level, how shall we justify our existence? I believe also that it is detrimental to architecture as an art that architects should specialise in designs on paper and become divorced from all practical matters such as quantity surveying. I think it must impair the vitality of their design work, and certainly cannot see why architecture and surveying cannot be carried on by one and the same person.

A LONDON ARCHITECT AND SURVEYOR.

SIR,—With reference to the letter of "A London Builder" in your issue of the 28th ult., on the above subject, may I, as a London quantity surveyor, offers a few remarks?

Your correspondent refers to certain differences between the quantities prepared by a firm of quantity surveyors and those prepared in the office of the architect responsible for the design. Such differences are only to be expected when one bears in mind the different training acquired by a quantity surveyor and that acquired by the architect or his assistant. The former has undergone a training of several years' duration to fit himself for his profession; the latter has probably studied the subject in his spare moments with the object of passing the so-called Examination in Quantities of the R.I.B.A.; or perhaps not even that. The remedy rests, I think, with the builder himself, who can generally see at a glance whether a bill of quantities is prepared by an experienced quantity surveyor, and, if not, can decline to tender, and possibly lose money over carrying out the job. Of course, whilst the R.I.B.A. and kindred societies persist in regarding quantities as part of their curriculum, so long will architects and architects' assistants persist in considering themselves capable of preparing bills of quantities, and the unfortunate builders who tender on such quantities will suffer loss, or even more frequently the unfortunate clients of such architects do so.

With reference to the question of this matter being dealt with by the Surveyors' Institution, I fear there is little prospect of this being done; it would be something altogether too practical. Possibly the Quantity Surveyors' Association might be more inclined to use its influence, but I doubt if either would be inclined to take any useful or effective steps, their principal object of existence, in both cases, being to obtain subscriptions and enrol members.

The real remedy is and must remain in the builders' own hands, and the sooner they realise the fact the better for themselves, for properly-qualified quantity surveyors, architects, and last, but not least, building owners.

DIMENSIONS.

The Nomenclature of London.

SIR,—The main thoroughfares, local centres, and street crossings in this maze of London should have appropriate, concise, and comprehensive names to serve as landmarks in the geography of the metropolis for the convenience of the population residing within its area as well as for the millions who visit it.

One name should dominate a main thoroughfare throughout its length. London should be mapped out and named on the principles adopted for town planning. The railway companies have given expressive names to their main lines of traffic: the thoroughfares of London should be dealt with likewise, and the benefits obtainable would be incalculable considering the small cost involved.

A street called Central-street or Oxford-street

should extend from Cheapside to Shepherd's Bush. The Hampstead-road from the Euston-road to the Tube Station, Hampstead, and Baker-street from Oxford-street to St. John's Wood Chapel. A Kensington-street or Kensington-road from Hyde Park Corner to the Broadway, Hammersmith, and a Mile End-road from Aldgate to Bow. All the local centres and crossings should have well-chosen historical and topographical names. The name of a well-known hostelry cannot reasonably form part of a business or residential address; appropriate names are, therefore, necessary for tram and omnibus services, drivers of motors, police, the travelling public, and also to relieve the business man of the worries of localising a street for the want of a name to the centre of a district. The centre at the Britannia should be called and be known as Camden Circus; the Angel as Islington Circus; the Cock, Highbury, as Highbury Corner; the Nag's Head as Holloway Cross; the south end of the Tottenham Court-road, at Oxford-street, should be Tottenham Circus; the meeting of Shaftesbury-avenue, Hart-street, and New Oxford-street should be Museum-broadway; the corner at Orchard-street should be Baker-street Corner.

The new names in most instances would be dominant additions to the present street addresses; the old names and numbers might remain for many years. A portion of the cost for disturbance should be allowed as compensation out of the rates, for renaming and renumbering it would be unjust for the occupiers of premises on a line of route to bear almost the entire cost of public improvements of this nature.

The postal districts of London require remodelling; the south-western district should be on the south side of the Thames, and the districts should be so defined that their boundaries could easily be remembered.

London year by year is growing more beautiful, and with improved nomenclature could be made more businesslike and enjoyable by concise and comprehensive names being given to all the main thoroughfares and chief centres.

ALFRED FRAMPTON.

INTERCOMMUNICATION COLUMN.

Inquiry from "Satyrane."

SIR,—In a small contract, which included several yards of retaining wall, it was found, owing to the presence of rock in the excavations, at points not expected, and on the site of the said walls, that such walls were not required, and were therefore not carried out. The contractor wishes to put the value of the excavated stone (now on the premises and the property of the building owner), some of which may be considered as "building material," against the value of the wall, in place of allowing a deduction to be made for the wall, contracted for, but not carried out. The face of the rock after the excavation is doing all that the wall was provided for, and I should value your opinion respecting the situation here created. "SATYRANE."

[*** Referring to our correspondent's inquiry, it all depends upon the terms of the contract. If builder agreed to build a wall of length and depth shown on a drawing, and certain parts are not required, the value of them can be deducted; but if contractor agreed to enclose a certain property with a sufficient wall, he taking the risk as to foundation, etc., no deduction can be made. The incidence of this risk is a matter that can only be determined by inspection of the contract, and our correspondent should consult a solicitor.—ED.]

SCHOOL BUILDINGS.

AN interesting book has recently been issued by the Middlesex Education Committee, entitled "Some Types of Secondary Schools in the Administrative County of Middlesex," written by Messrs. B. L. Gott, the Secretary, and H. G. Crothall, County Education Architect. The book is profusely illustrated, giving photographs, plans, and elevations of the most typical buildings provided for secondary schools. The following are some of the particulars of the more important structures:—

Ashford County School.—The building has been designed to accommodate at present 200 boys and girls, and has been so arranged that at any future time it can be extended if required. Instead of a central hall with classrooms opening from it on all sides, the classrooms are built around an open quadrangle, so that each classroom may be ventilated on both sides direct to the fresh air. Each classroom has a large amount of main window area on the outer wall, and each window is fitted with glazed hoppers at the bottom, so as to admit of a plentiful supply of fresh air without draught. The borrowed lights of the classrooms on the corridor sides correspond with the windows on the quadrangle side of the corridors, and are arranged as vertical louvres. These can be opened or closed, according to the weather, by means of screw gearing. In very cold weather, when it may be found necessary to close the outer windows of the corridor, the through ventilation of the classroom is provided for by means of a dormer window over the corridor roof. By these means the classrooms will obtain a constant change of atmosphere. The assembly hall is placed at the rear of the buildings and is approached from the classrooms by means of the corridors, and such subjects as drill or singing can be carried on without disturbing the work of the classes. The accommodation provides for eight classrooms, chemical laboratory, physical laboratory, preparation and balance room, darkroom, principal's room, rooms for the staff, and cloakrooms, lavatories, and changing-rooms for boys and girls. The front elevation is two stories in height, and the remainder of the building on one floor only. The total cost of erection and furnishing, etc., amounts to £11,027.

Enfield County School for Girls and Technical Institute.—This building constitutes a large extension of the original Grammar School. The site chosen is about five acres in extent and cost £4,785. The building has been also so planned that, should the circumstances warrant it, it can be easily enlarged without great expense or interference with the working of the school and with the following accommodation:—A large assembly hall, eight classrooms, accommodating 220 students, physical laboratory, chemical laboratory, balance and preparation room, cookery and domestic subjects room, art-room, two large workshops, library, secretary's office, principal's room, and rooms for the staff of the school and technical institute. All the essential parts of the floors are of fireproof construction, and wide fireproof staircases are provided at each end of the building. The cost of the buildings, inclusive of quantity surveyor's and clerk of work's fees, fencing, the playing field, and furniture, amounted to £18,018.

Enfield Grammar School.—The original building appears to have been erected at the latter end of the sixteenth century, although there are no records of the exact date of building. It is a very good example of the architecture of that period. In 1875 alterations and restorations were carried out and new and larger windows were inserted on the ground and first floors. These windows, unfortunately, did not follow the style of the original building. In 1883 the headmaster's house was erected, and later the block of buildings which form the science and class rooms. In carrying out the present extensions the style and feeling of the original building has been followed: modern requirements have, however, made it impossible to keep to the exact lines of the old building. The old assembly-rooms at the rear of the school have been renovated and converted into science-room, school library, and common-room. The cost of the purchase of the additional land and of the provision of the extensions has been approximately £7,500.

Wood Green County School.—The site upon which the new building stands is situate in Glendale-avenue, Wood Green, and is six acres in extent, the cost of which was £5,100. The building has been designed to meet the requirements of a county secondary school for boys and girls, with much larger accommodation than is required at present. The first floor over the laboratories has been temporarily roofed over until it is required to complete the school by adding additional classrooms. The hall is designed for the completed school, but, as the larger area is not required for the incomplete building, the end portions have been partitioned off to form classrooms. The following is the accommodation now provided:—A large assembly hall capable of seating 500 people, eight classrooms for 202 students, chemical laboratory, physical laboratory, balance-room, darkroom, handicraft workshop, domestics, subjects, and cookery room, dining-room, principal's room, room for staff, cycle store, cloakrooms, lavatories, and changing-room for both sexes. The cost of the building, inclusive of quantity surveyor's charges and clerk of work's wages, work to playing fields, furniture and fittings, and site, amounted to £17,365. The school is now to be enlarged so as to provide in all for 350 pupils, the estimated cost of the enlargement being £5,500. The total cost of the buildings, etc., and furniture for 350 pupils will, therefore, be £17,765, or about £50 per school place. Concluding, the authors deal with the fitting up of chemical laboratories, and state that the following plan is found to answer well:—Along the outside walls are benches fitted with sinks, water, gas, and the necessary reagents, and across the width of the room benches fitted with gas only. These centre benches are so made that students can sit at them to do theoretical work, and, when used for practical work, the stools are put under the bench in the knee space, which extends to half the depth of the bench, the front being filled in with glass-fronted cupboards. This system has the advantage of combining the theoretical and practical work in one room, as well as saving the cost of a lecture theatre. For the science master's use a raised platform 1 ft. high is placed at one end of the room. On this platform is a demonstration bench fitted with sink, gas, and water. The top of the demonstration bench is formed of a white "Marmorite" slab, to form a clean impervious surface and to form a good background for any apparatus in use. The back of the demonstration bench is fitted with drawers and cupboards for storage of apparatus. The wall surface at the end of the room is either prepared as a writing surface or two large reversible blackboards are provided. Leading from the laboratory are the preparation and dark rooms and stores. For a class of twenty-four to thirty pupils it has generally been found sufficient to provide two good fume chambers in the laboratory. It has been found by experience that it is very much better to have no cupboard fronts in the benches, which have sinks, in order that the trough receiving the sink wastes may always be easily accessible.

PARLIAMENTARY NOTES.

Houses of Parliament Building.

THE Civil Service estimates for 1913-14 contain the item of £5,700 for new works, alterations, and additions. This includes £550 for providing a granite base and setting up Rodin's bronze figures, "Burghers of Calais," in Victoria Tower Gardens; and £2,000 for the installation of a passenger lift in the House of Commons.

Fair Wages.

Answering a question put by Mr. Tyson Wilson in the Parliamentary Papers, Mr. Wedgwood Benn states that the First Commissioner of Works had investigated the allegation against Messrs. Gutteridge & Sons, builders, of Peterborough, who are executing work at the Peterborough Post Office, and was satisfied that the firm were loyally observing the terms of the fair wages resolution.

Edinburgh Government Buildings.

Mr. J. Hogge, on Monday, asked when it was proposed to issue the terms of the competition for the new Government buildings in Edinburgh, and who had been appointed to adjudicate on the results. Mr. Benn replied that the First Commissioner of Works was unable at present to fix a date for the issue of the terms of the competition. An assessor had not yet been appointed, although negotiations on the matter were in progress.

Works in Government Buildings.

The following are amongst the items contained in the Civil Service estimates for new works during the forthcoming year:—Reconstruction of Glasgow Justiciary Court, £3,460; extension of Wandsworth County Court, £2,480; erection of new spirit building at Natural History Museum, £8,000; erection of last section of New Science building at South Kensington, £15,000; erection of administrative offices, Royal Scottish Museum, £2,400, and extension of Natural History Galleries, £6,000; new legation house at Sofia, £4,800; erection of legation house at Stockholm, £8,600; rebuilding Consulate-General, Tunis, £4,000; rebuilding at General Post Office, East, £5,000; Battersea District Post Office extension, £9,850; extension of North-Western District Office, £20,000; extension of South-Eastern District Office, £9,640; new post-office, Barking, £4,000; Bingley Post Office, £3,200; new sorting office, Birkenhead, £2,800; new parcels office, Birmingham, £21,000; new telephone stores, Birmingham, £35,000; Bolton Post Office, £2,000 parcel sorting Office, Bournemouth, £2,000; new office, Carlisle, £5,000; post-office extension, Darlington, £3,800; new office, Dover, £8,000; extension of Folkestone Post Office, £2,700; new post-office, Harrow, £4,525; extension of sorting office, High Wycombe, £2,090; new post-office, Huddersfield, £10 000; Middlesbrough Post Office extension, £6,000; new post-office, Northampton, £3,000; Portsmouth Post Office extension, £2,150; sorting office extension, Shrewsbury, £4,000; new station sorting office, Stafford, £5,000; Glasgow Post Office extension, £20,000; erection of offices for Board of Agriculture, £20,000; alterations at National Gallery, £10,000; erection of new offices for Public Trustee and Lunacy Departments, £20,000; and new building for Stationery Office, £70,000.

Leading Contents.

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ILLUSTRATIONS.

Lambay Castle and the Lodge, Knowlton, Kent.

WE illustrate interesting examples of Mr. Lutyens' domestic work, comprising additions made to an Irish house and some details of a Kentish house, both of which bear testimony to the interest and scholarship of the architect's work

MEETINGS.

FRIDAY, MARCH 28.

The Royal Sanitary Institute.—Mr. Henry C. Adams on "Sewerage." 7 p.m.

Glasgow Architectural Craftsmen's Society.—Business meeting.

MONDAY, MARCH 31.

The Royal Sanitary Institute.—Mr H. C. Adams on "Sewage Disposal." 7 p.m.

TUESDAY, APRIL 1.

Institution of Civil Engineers.—Mr. W. C. Reid on "The Yield of Various Catchment-Areas in Scotland," and Mr. E. Sandeman on "Measurement of the Flow of the River Derwent." 8 p.m.

University of London (British Museum).—Mr. Kaines Smith on "Greek Art and National Life." 4.30 p.m.

WEDNESDAY, APRIL 2.

Institution of Civil Engineers.—Students' visit to Kingston Bridge Widening Works.

The Royal Archæological Institute.—Mr. Harold Brakspear on "Dudley Castle," and Rev. W. G. Clark-Maxwell on "Sir W. Sharington's Work at Lacock Abbey and Sudeley and Dudley Castles." 4.30 p.m.

Institute of Sanitary Engineers.—Mr. A. H. Barker on "Heating and Ventilation." 8 p.m.

The Royal Sanitary Institute.—Mr. H. C. Adams on "Water Supply, Sources of Supply and Distribution." 7 p.m.

Edinburgh Architectural Association.—Mr. H. F. Kerr on "Some Scottish Houses of the Sixteenth, Seventeenth, and Eighteenth Centuries." 8 p.m.

THURSDAY, APRIL 3.

Carpenters' Hall, London-wall.—Sir Whitworth Wallis on "Sicily—Ancient and Modern." 8 p.m.

The University of London (Victoria and Albert Museum).—Mr. Kaines Smith on "Five Centuries of Decorative Art." 3.30 p.m.

Society of Antiquaries.—8 p.m.

Sheffield Society of Architects.—Mr. S. H. Williams on "The Buildings of Rouen."

FRIDAY, APRIL 4.

The Royal Sanitary Institute.—Mr. H. C. Adams on "Scavenging, Disposal of House Refuse." 7 p.m.

THE NEW EUSTON.

THE two plans accompanying this note show Euston Station as it is and as it will be when the alterations now in progress are completed. The scheme has been prepared in the Engineering and Architectural Departments of the London and North-Western Railway Company, and the contract has been let to Messrs. Perry & Co., of Bow.

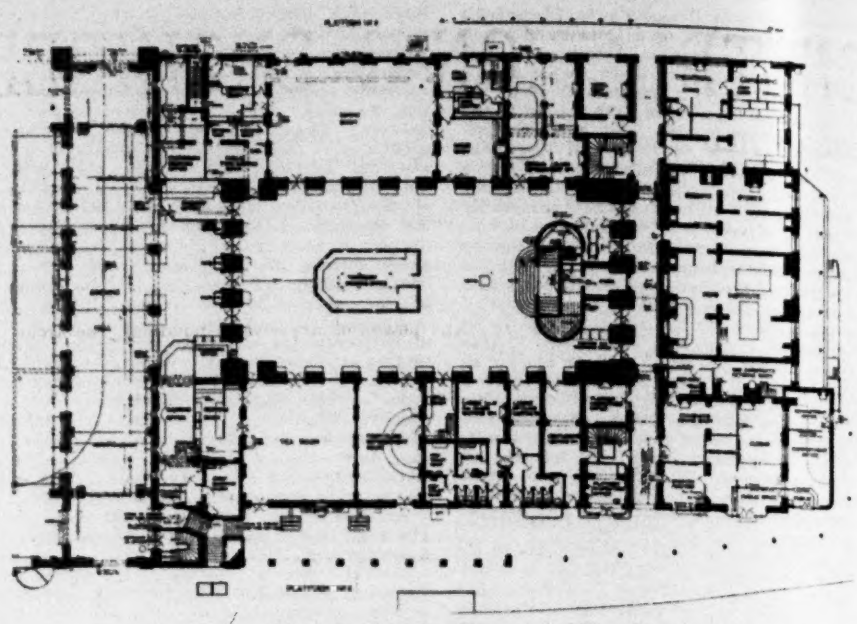
The present courtyard will be reduced in size by the addition to the present frontage of a booking-hall, 163 ft. long by 28 ft. wide. This structure will be the key to the station, containing, as it will, indicator-boards showing from the outside and inside, various booking-places, an inquiry office, telegraph office, and an entrance to the Tube subway. The outside face will be of Portland stone. Inside, there will be polished stone pilasters with oak panelling between The barrel-vault ceiling with the centre portion of glass will be supported by coffered plaster ribs.

The courtyard immediately in front of the new booking-hall will be covered completely by a new steel-framed glass roof, the front girders being supported by two stanchions. The entrance, as at present, will be through Hardwick's Doric portico, and a new road will be made to facilitate the exit of vehicles from the station.

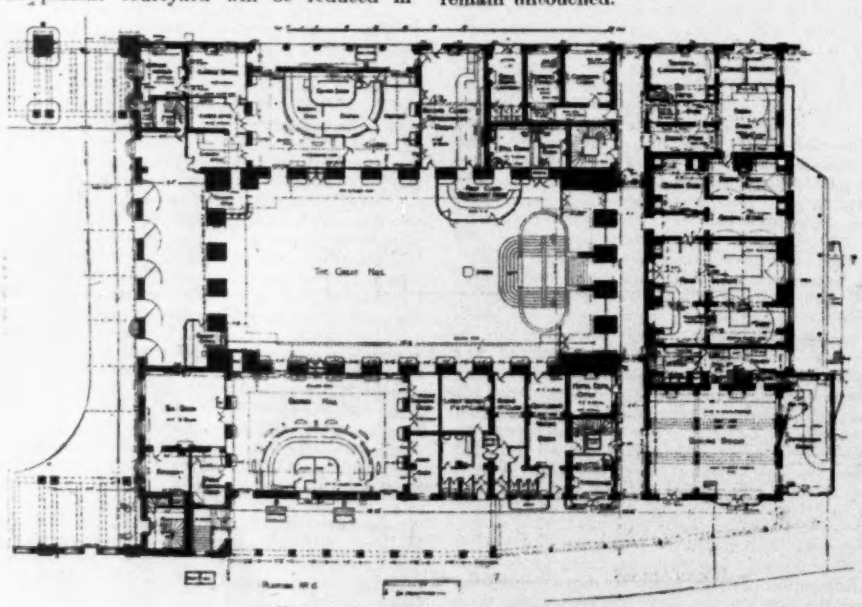
The Great Hall, which G. F. Watts wished to decorate many years ago, will be more a real centre than it has been in the past. Around it will be grouped the various accessories to a railway-station. The east booking-hall will be divided; one portion will be converted into a tea-room, which will be decorated with white panelling to a height of 8 ft., and will have a glass dome, the other portion will be a refreshment-room. The adjacent waiting-rooms will remain as at present, while the existing dining-room will be altered to form offices for the staff of the station-master.

On the west of the Great Hall the chief feature will be a new dining-room, 56 ft. long by 38 ft. wide, fitted with oak panelling and otherwise decorated suitably.

Owing to the necessity of keeping everything in good order during the alterations, it is expected that the scheme will not be completed until early in 1915. The permanent way will remain untouched.



Euston Station: showing Proposed Alterations.



Euston Station: as at Present.

COMPETITION NEWS.

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A country house, to be built in Sussex, from the first prize design. First premium, £80; architect's fees to winner of first premium (approximately), £150; second premium, £40; third premium, £20; perspective prize, £20; model prize, £20; book prizes to the value of £20. The site is 2 acres in extent, on the Ryst Wood Estate, Forest Row. Full particulars, with all levels, will be supplied to intending competitors on application to the offices, No. 20, Tavistock-square; a model of the site can also be seen. Accommodation: House is not to contain more than 65,000 cubic ft., and should be so designed that it can be built for 10d. a cubic foot. Three reception-rooms, hall, and not less than six bedrooms, two dressing-rooms, two bathrooms, and servants' bedrooms. Garage, cost not to exceed £300, connected to or apart from house. Drawings required: Three sheets imperial size, $\frac{1}{8}$th scale and $\frac{1}{2}$-in. details: perspective optional. Condition of entry: The competitor to be a subscriber to *Country Life* or to undertake to subscribe for one year.

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FIFTY YEARS AGO.

From the *Builder* of March 28, 1863.

Crinoline and Combustible Dresses.

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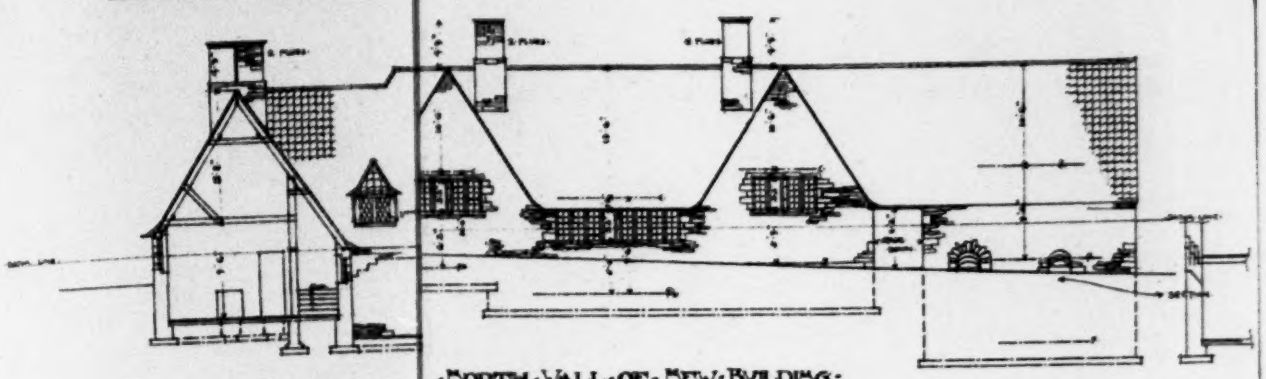
LAMBAY CAST

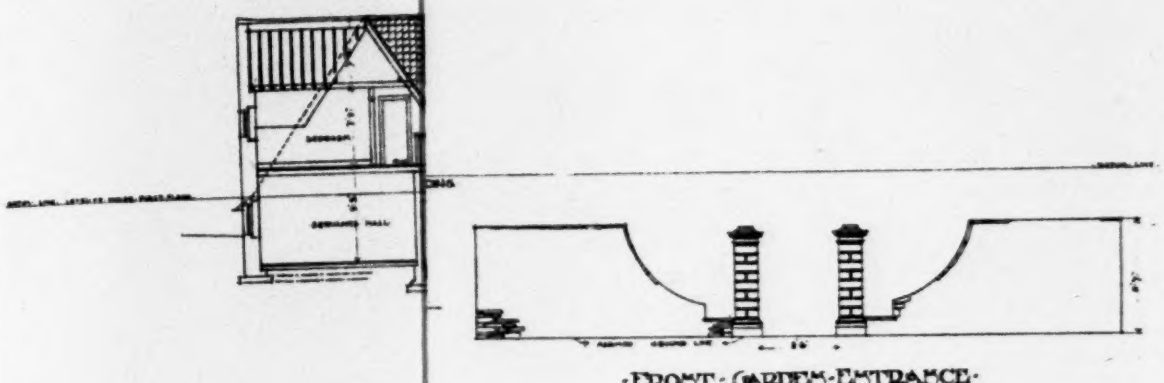
FOR THE HON^{BLE} CEC

ADDITIONS & ALTERATIONS

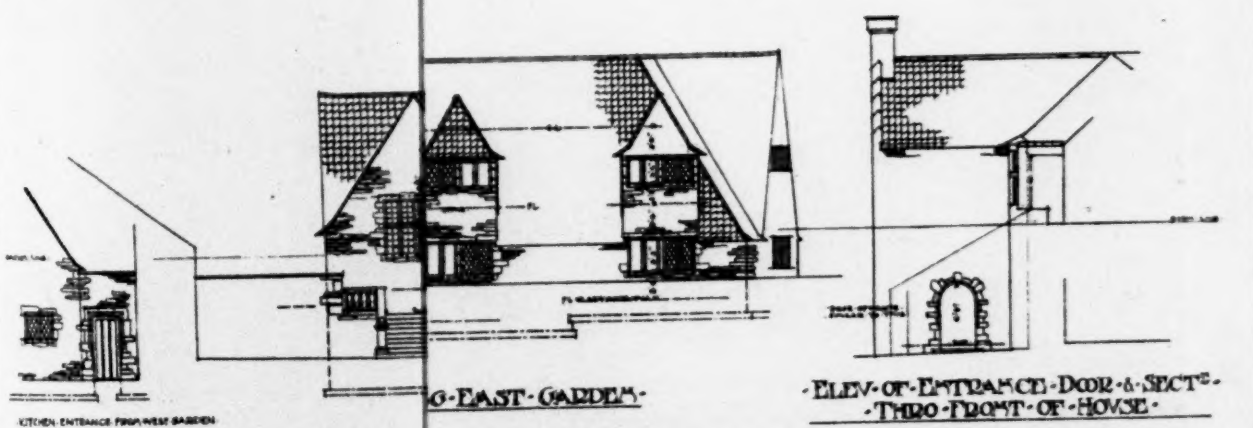


EAST WALL

NORTH WALL OF NEW BUILDING



FRONT GARDEN ENTRANCE



KITCHEN ENTRANCE FROM WEST GARDEN

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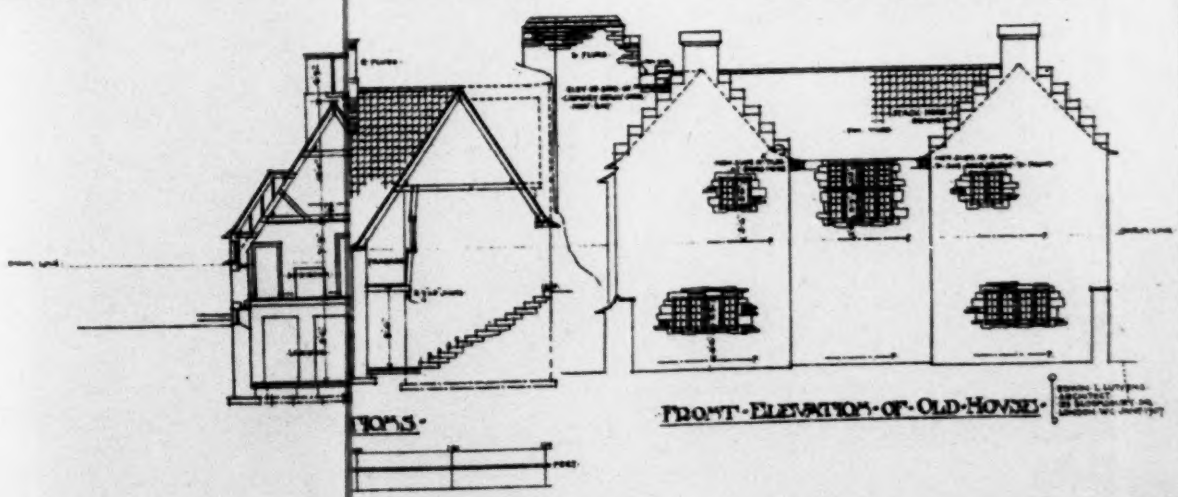
ELEV OF ENTRANCE DOOR & SECT^{N}
THRO FRONT OF HOUSE



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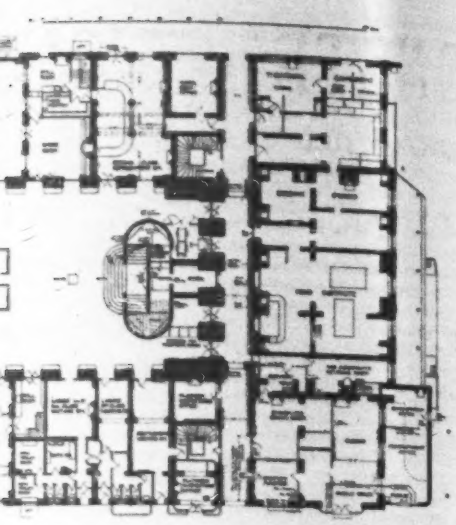
FRONT ELEVATION OF OLD HOUSE

PHOTO-LITHO. SPRAGUE & Co LT^{D} 69 & 70 DEAN STREET SOHO W.



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LAMBAY · CASTLE · LAMBAY · ISLAND · IRELAND ·
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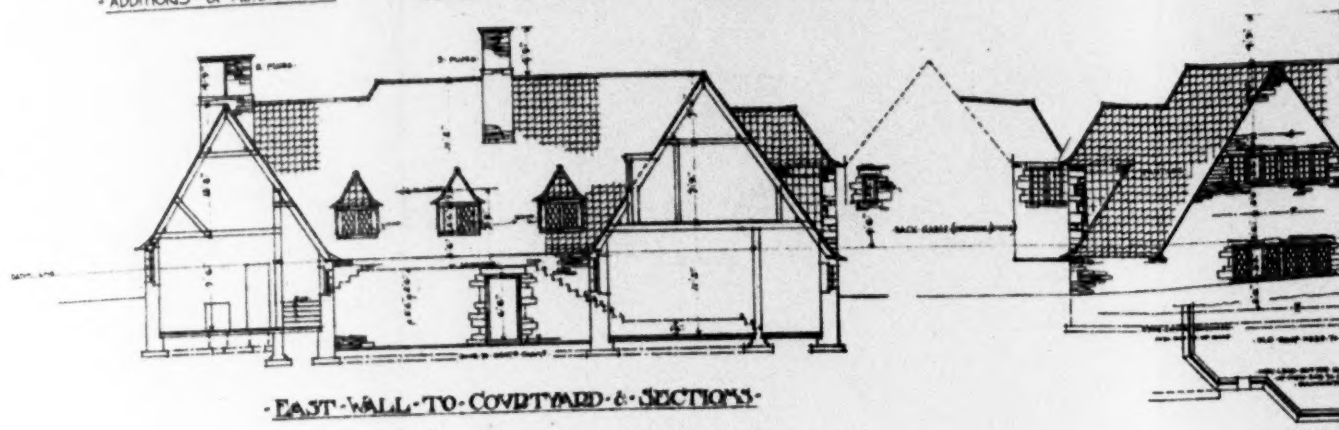
· ADDITIONS · & · ALTERATIONS · · ELEVATIONS · & · SECTIONS · · DRAWING N^O 3 ·



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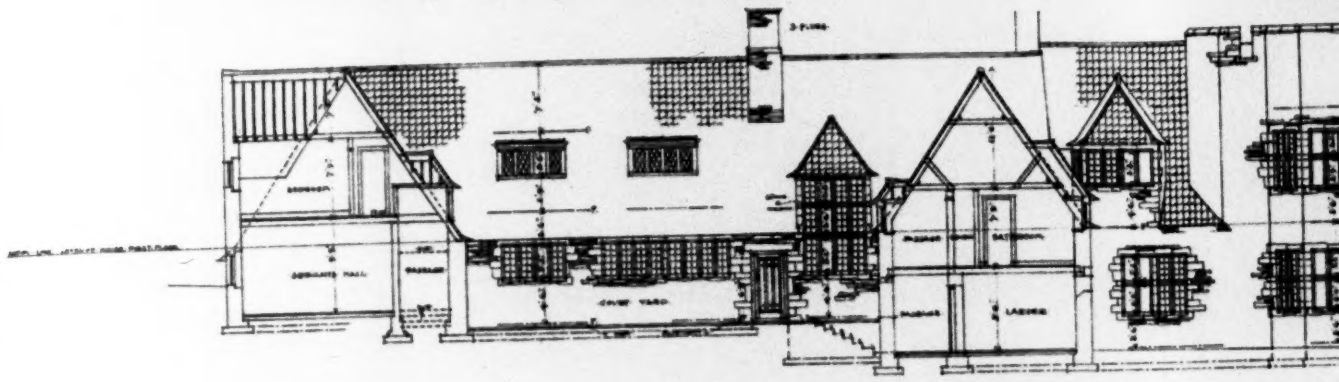

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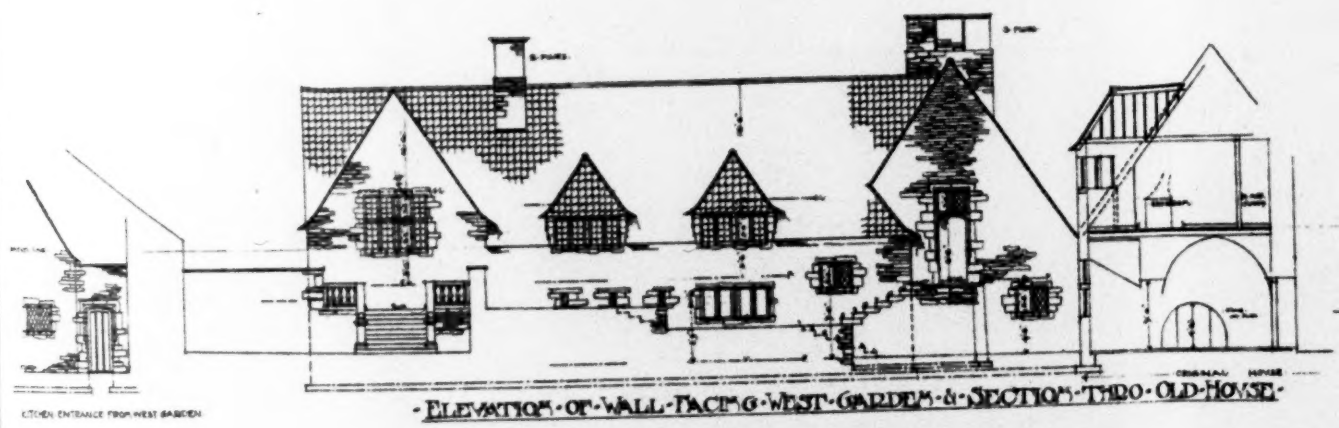

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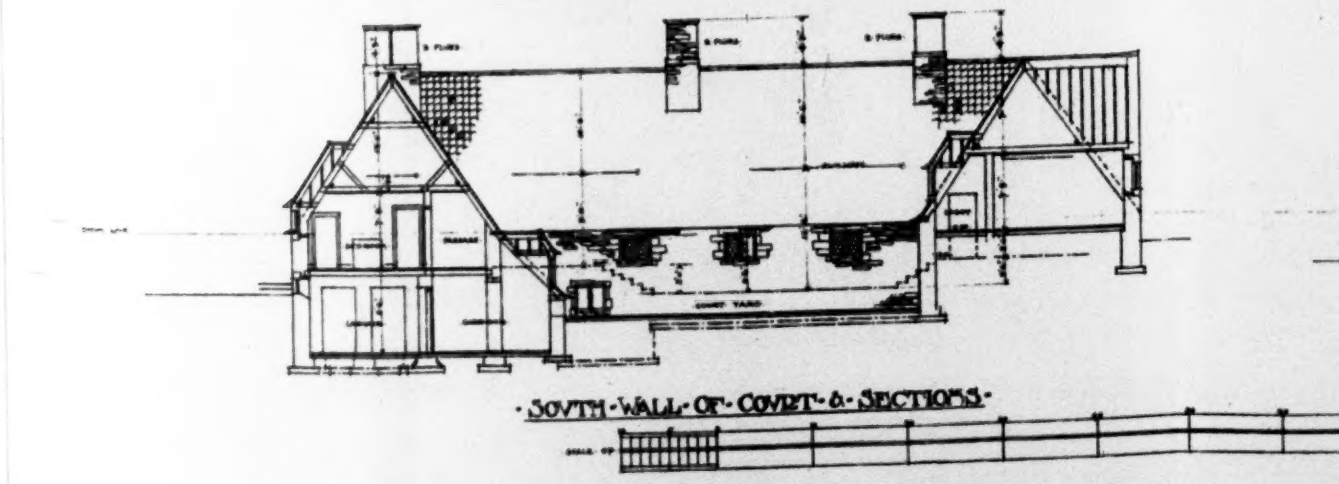

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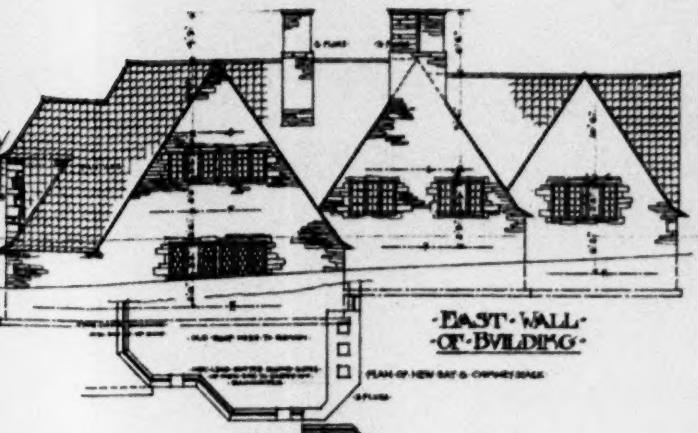
LAMBAY CASTLE, IRELAND.—



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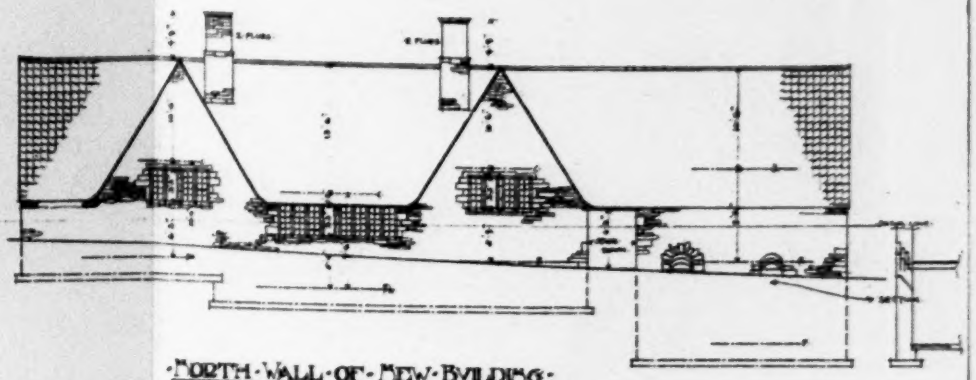

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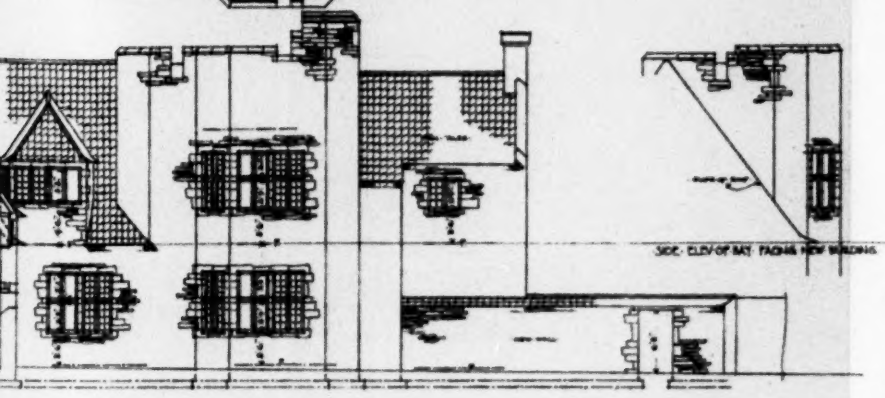

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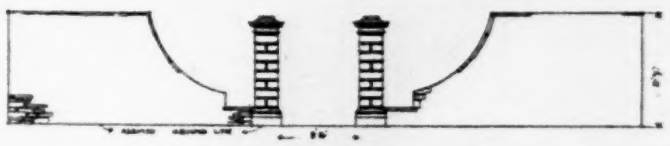
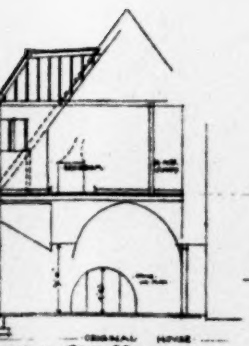
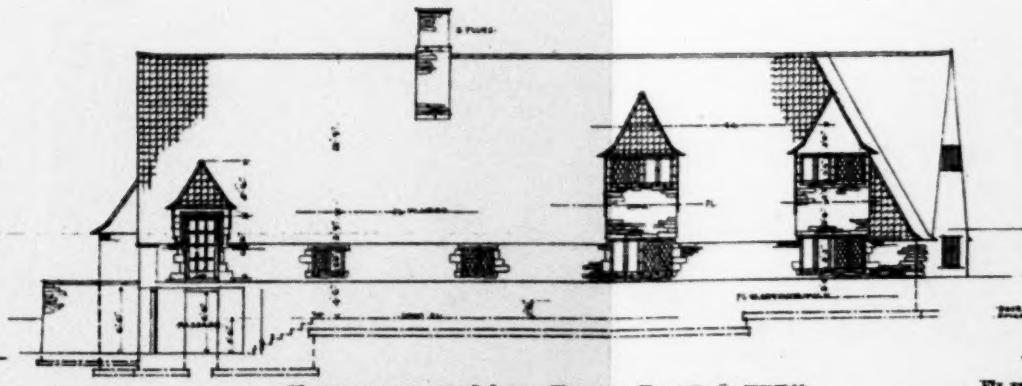


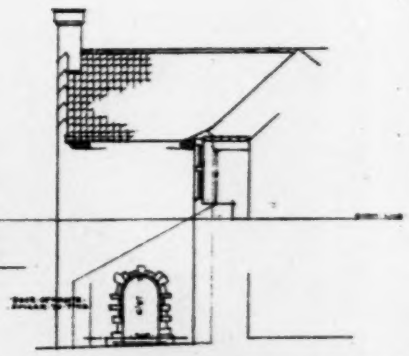
·FRONT·GARDEN·ENTRANCE·



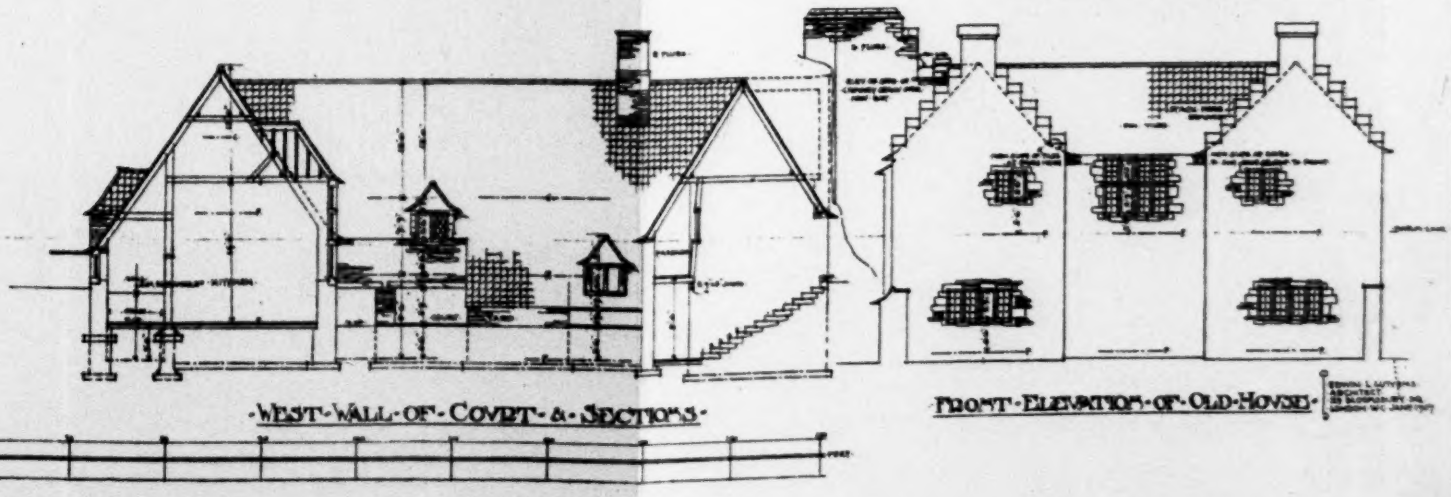
·THRO·OLD·HOUSE·



·ELEVATION·OF·WALL·FACING·EAST·GARDEN·



·ELEV·OF·ENTRANCE·DOOR·&·SECTS·
·THRO·FRONT·OF·HOUSE·

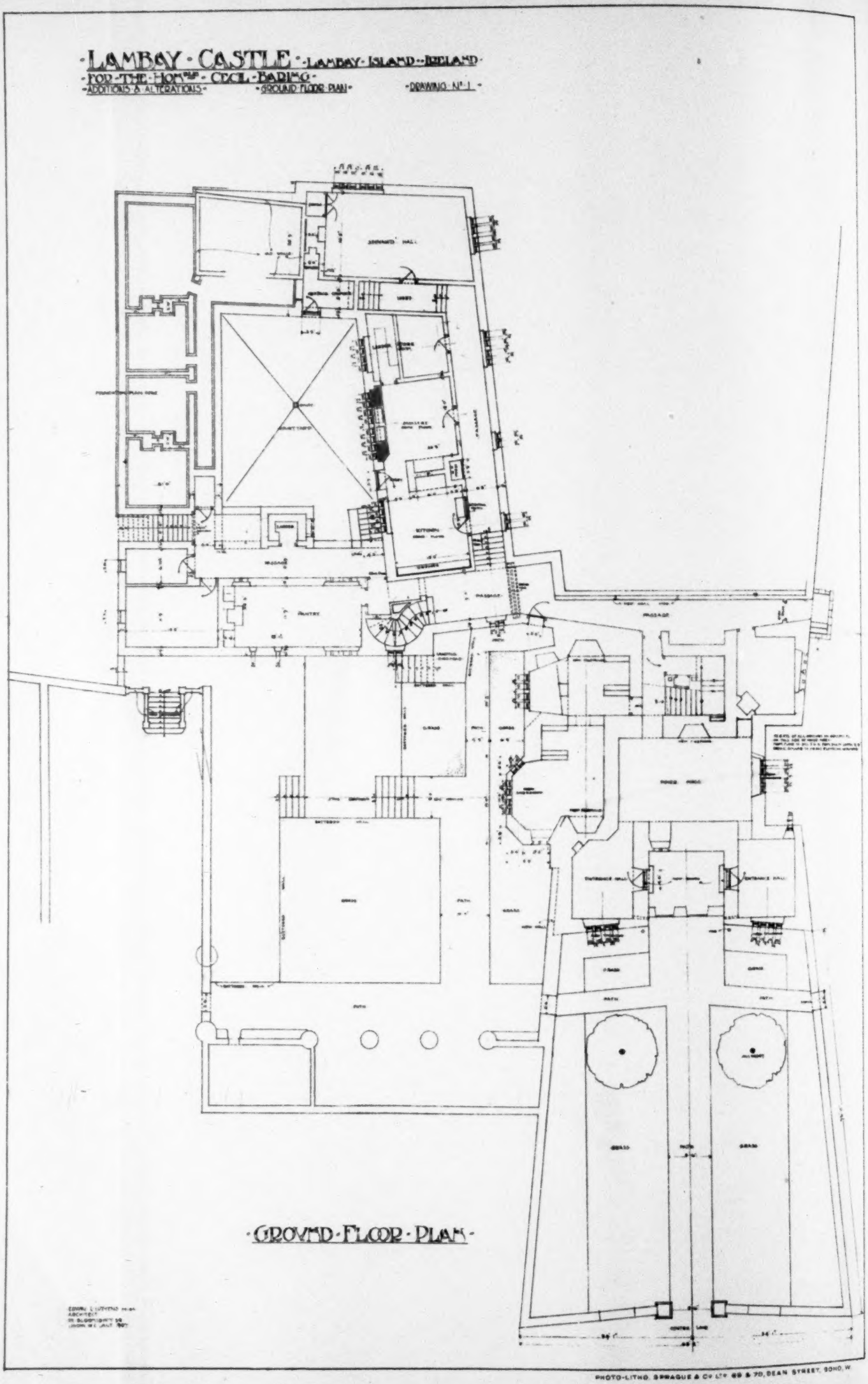


·WEST·WALL·OF·COVERT·&·SECTIONS·

·FRONT·ELEVATION·OF·OLD·HOUSE·

PHOTO-LITHO. SPRAGUE & Co LTD 69 & 70, DEAN STREET, SOHO, W.

ASTLE, IRELAND.—Mr. Edwin L. Lutyens, A.R.A., Architect.

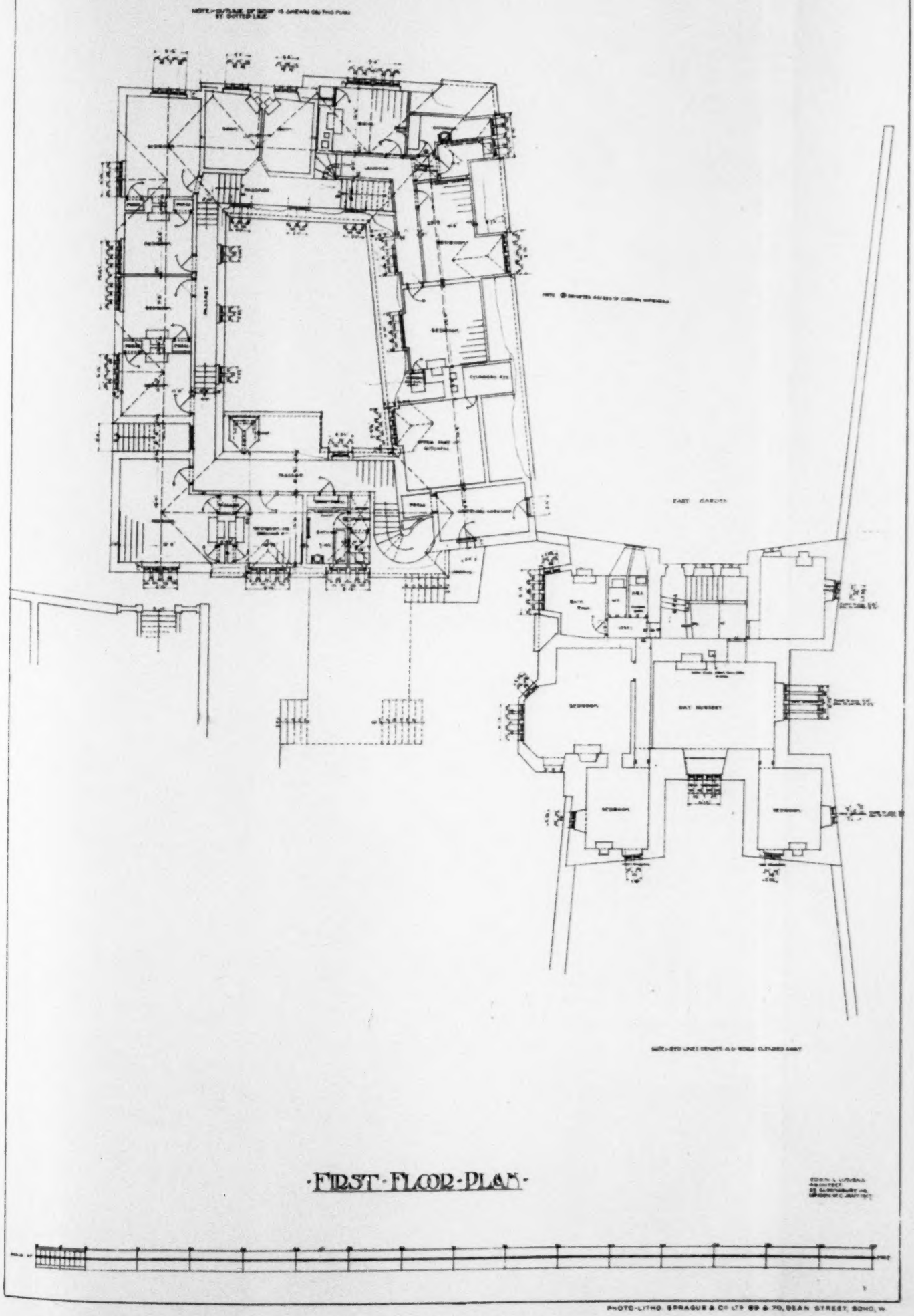

LAMBAY CASTLE · LAMBAY ISLAND · IRELAND
FOR THE HON.BLE CECIL BARING
ADDITIONS & ALTERATIONS
GROUND FLOOR PLAN
DRAWING N.O 1
GROUND FLOOR PLAN
EDWIN L LUTYENS R.A.
ARCHITECT
PHOTO-LITHO. SPRAGUE & Co LTD 69 & 70, DEAN STREET, SOHO, W.

LAMBAY CASTLE, IRELAND.—Mr. Edwin L. Lutyens, A.R.A., Architect.

LAMBAY CASTLE, LAMBAY ISLAND, IRELAND

FOR THE HON^BLE CECIL BARING

ADDITIONS & ALTERATIONS. FIRST FLOOR PLAN. DRAWING N°2.



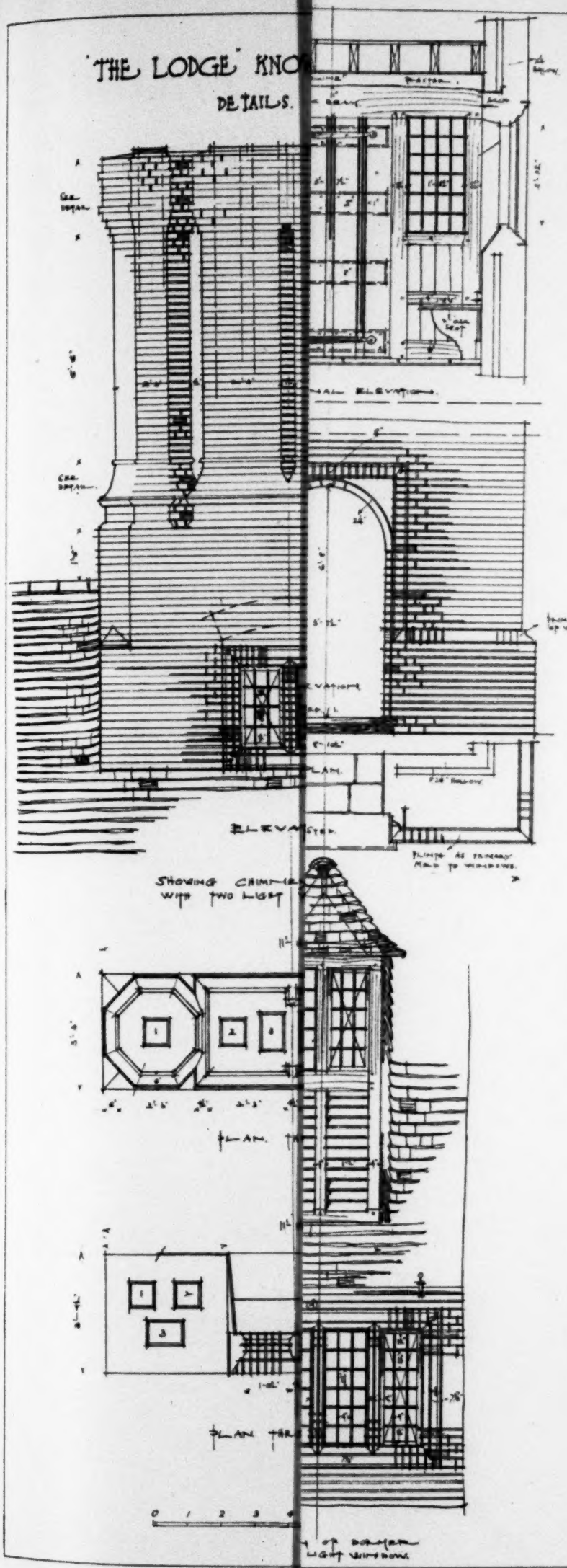
FIRST FLOOR PLAN

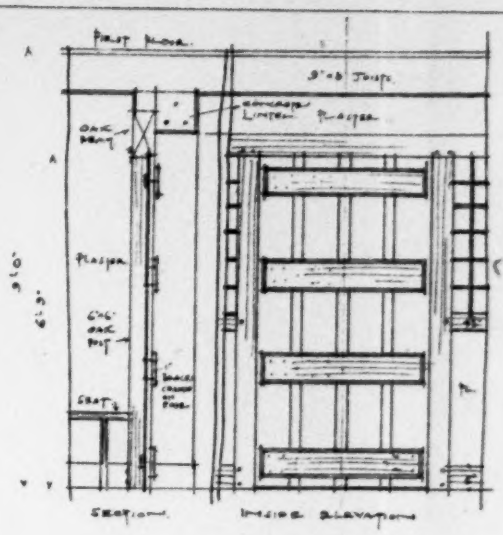
PHOTO-LITHO. SPRAGUE & Co LTD 69 & 70, DEAN STREET, SOHO, W.

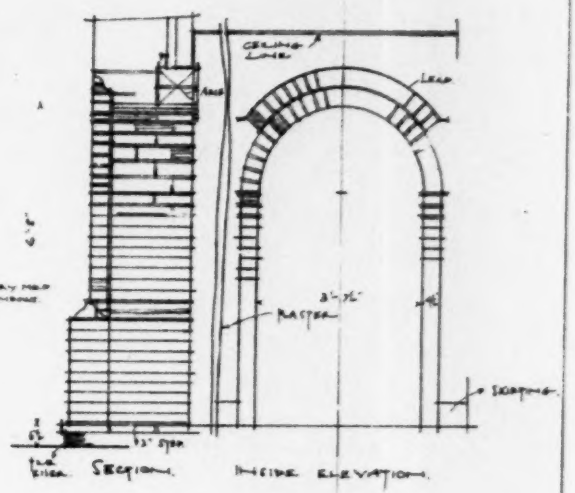
LAMBAY CASTLE, IRELAND.—Mr. Edwin L. Lutyens, A.R.A., Architect.

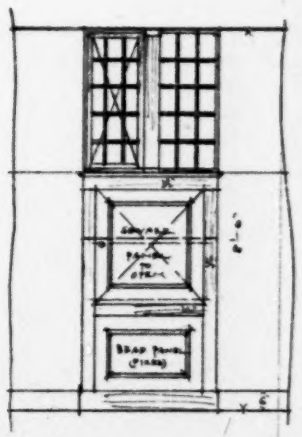
'THE LODGE' KNO

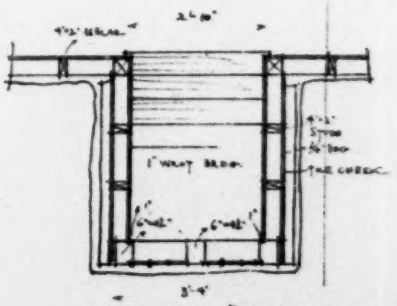
DETAILS.











E. L. LUTYENS ARCHT.
17 QUEEN ANNE'S GATE
S.W. MAY 21 1912

PHOTO-LITHO. SPRAGUE & Co LTD 69 & 70, DEAN STREET, SOHO, W.

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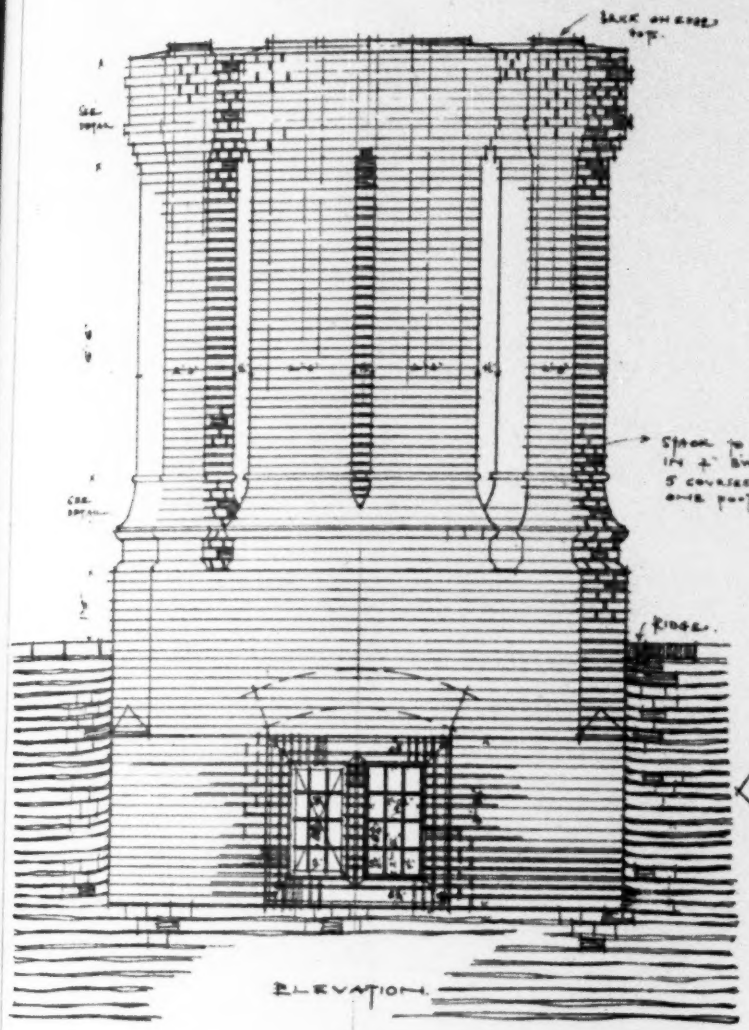
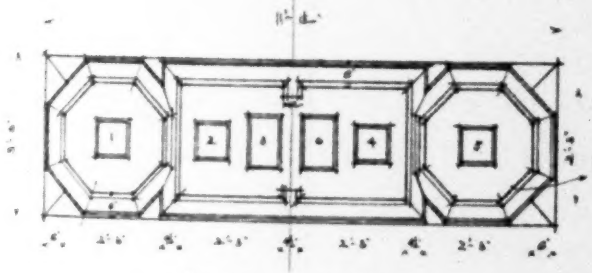
'THE LODGE' KNOWLTON. CANTERBURY.

DETAILS.



ELEVATION.

SHOWING CHIMNEY STACK WITH TWO LIGHT WINDOW AT BASE.



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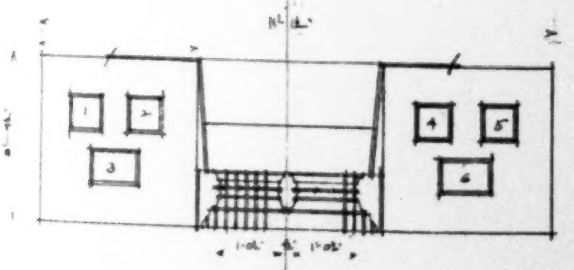

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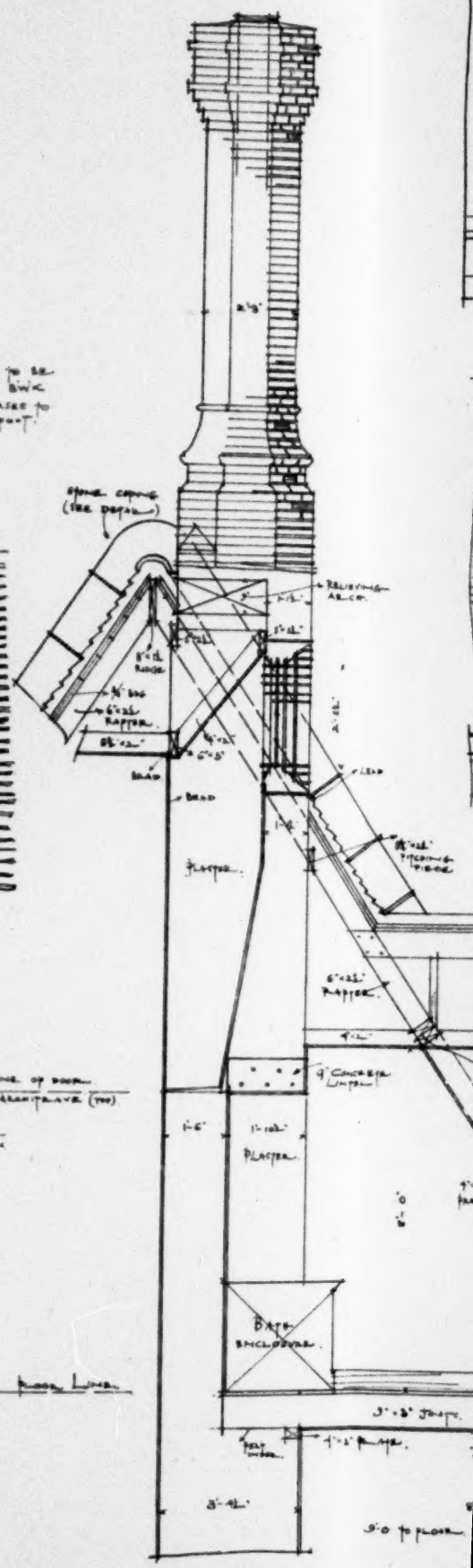
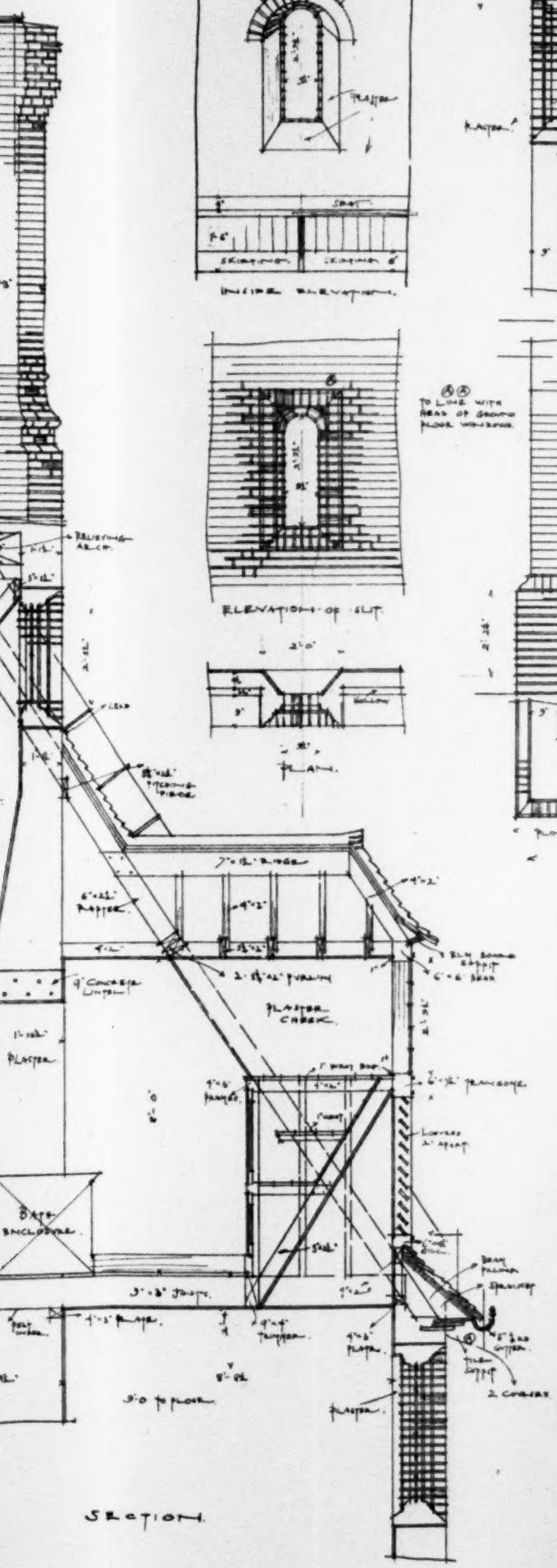
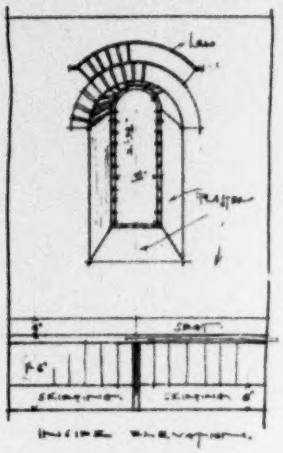


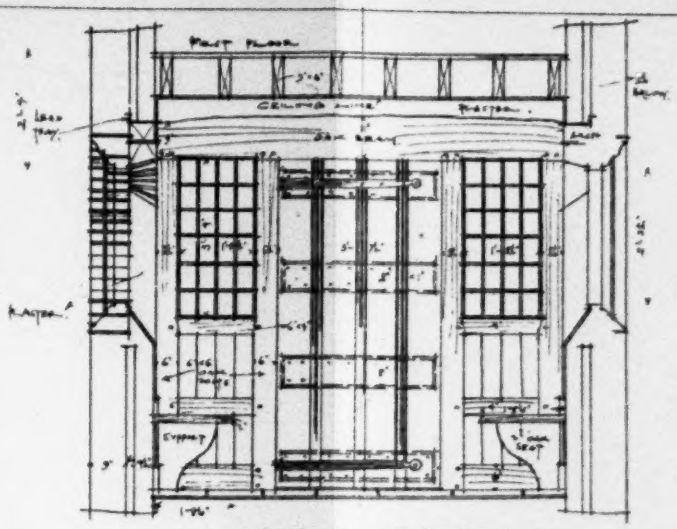
SECTION.

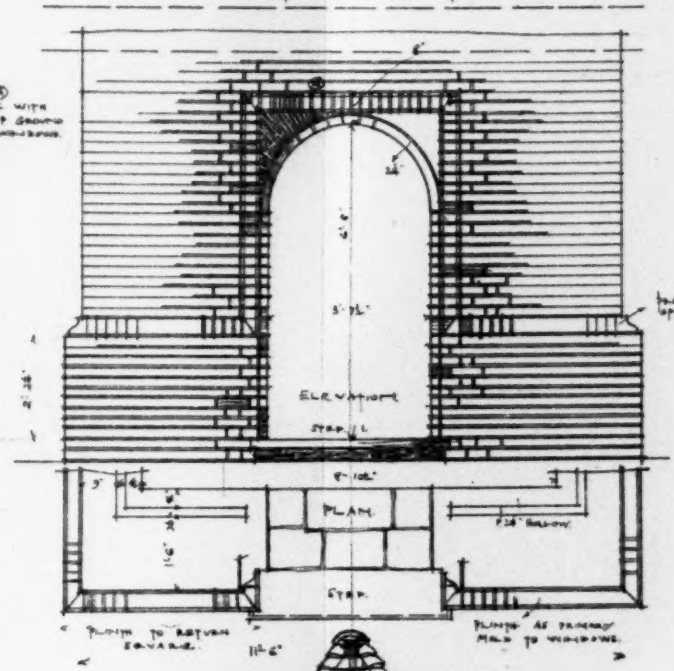
SCALE

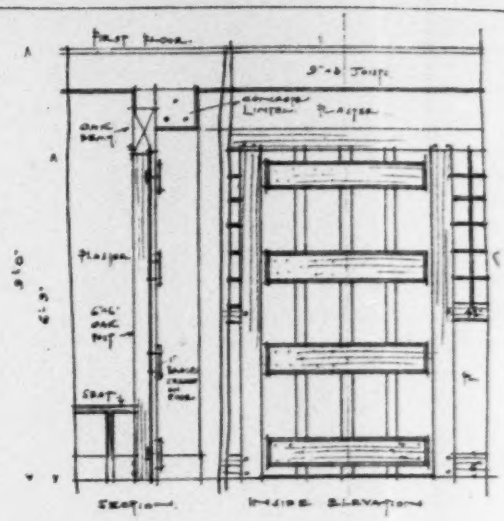
0 1 2 3 4 5 10 15 Feet

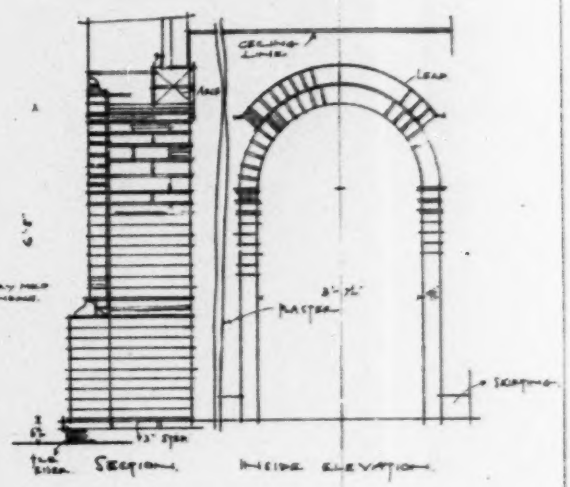


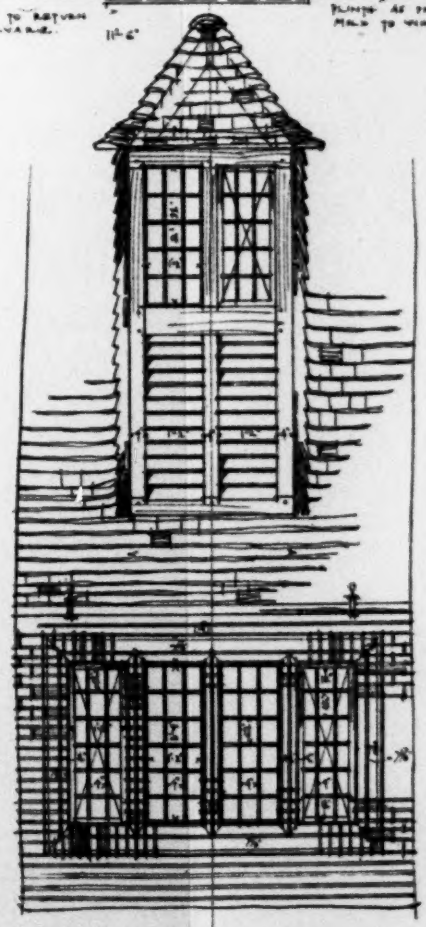


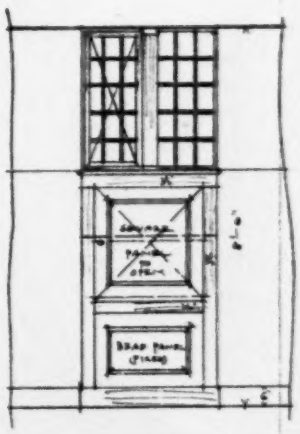












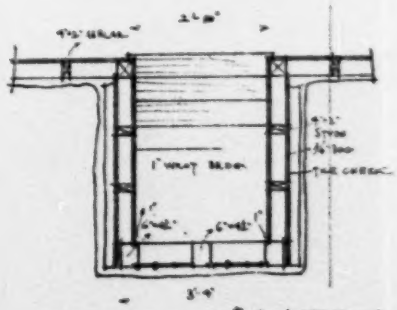


PHOTO-LITHO. SPRAGUE & CO. LTD. 69 & 70, DEAN STREET, SOHO, W.

KNOWLTON, CANTERBURY: DETAILS.—Mr. Edwin L. Lutyens, A.R.A., Architect.

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CONSTRUCTION & ENGINEERING REVIEW.

SNOW HILL STATION, BIRMINGHAM.

IN a paper read by Mr. R. P. Mears, A.M.Inst.C.E., at a combined meeting of the Junior Institution of Engineers and the Architectural Association, a complete account is given of the new station constructed at Snow-hill, Birmingham, by the Great Western Railway Company. The paper professes to deal with the "engineering and architectural features" of the station, but those of the latter order are not very conspicuous in the text, from which the following particulars and the accompanying illustrations have been taken.

General Arrangement.

The station is the third erected on the site by the Great Western Railway. The first was a timber structure, since removed to Didcot, the second was built in 1871, and has recently been demolished to make room for the present station, now practically complete.

At rail level the station comprises two island platforms and two bays at the north end. On the platforms are several buildings, the architectural treatment of which is said to be very pleasing, and the refreshment-rooms are decorated internally with panelled oak.

The main entrance to the station is through the high-level booking-office, immediately behind the hotel, which faces Colmore-row. The booking-hall floor is about 22 ft. above rail level, being reached on one side by an incline from Livery-street, on the other side by a stairway from Snow-hill, and at the front by an archway cut through the hotel building. A main subway, 20 ft. wide, has been constructed at about the middle of the station, connected with the platforms by stairways and luggage lifts.

A low-level booking-hall, 18 ft. below rail level, is entered from Great Charles-street, and communicates with the up and down platforms by means of stairways.

The platform buildings provide spacious

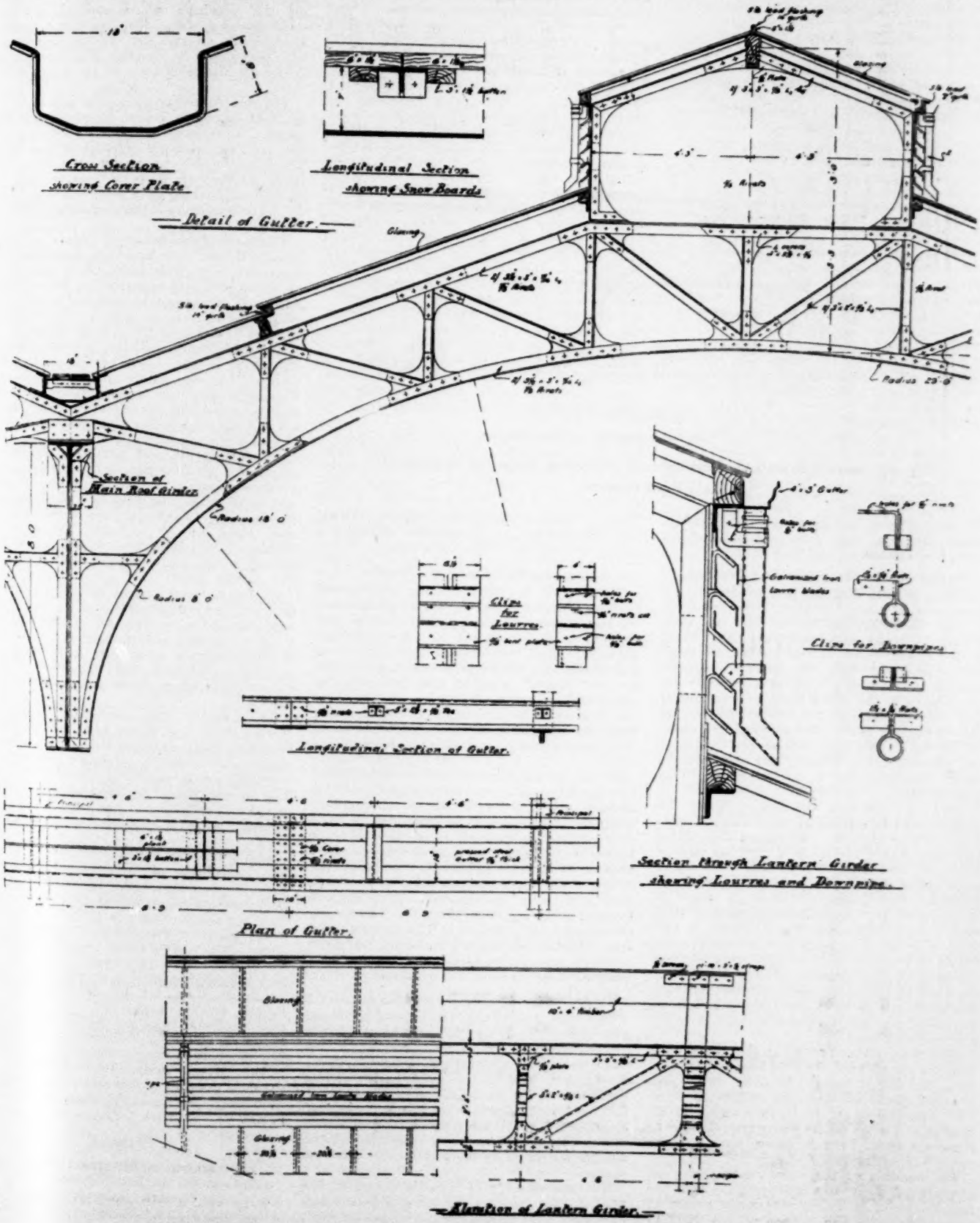

Cross Section showing Corner Plate
Longitudinal Section showing Snow Boards
Detail of Gutter
Section of Main Roof Girder
Radius 15' 0
Radius 6' 0
Clips for Louvres
Longitudinal Section of Gutter
Plan of Gutter
Section through Lantern Girder showing Louvres and Downpipe
Clips for Downpipes
Elevation of Lantern Girder

Fig. 1. Snow-hill Station, Birmingham: Details of Roof Construction.

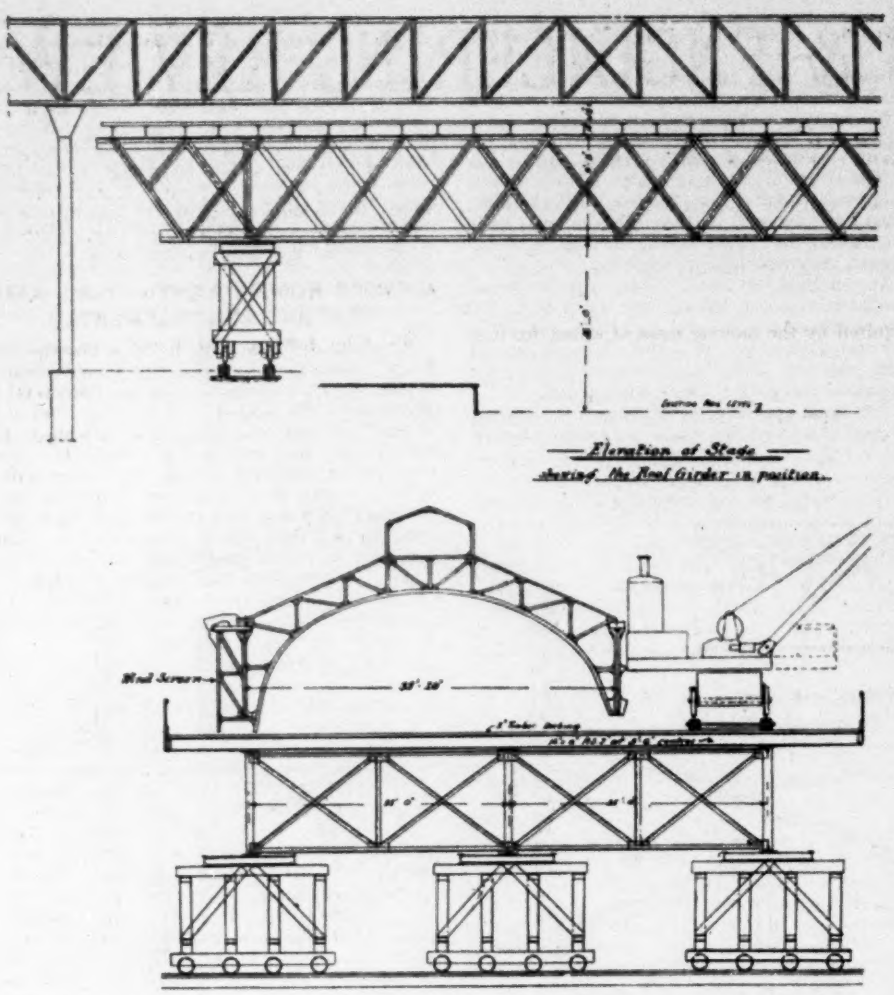


Fig. 2. Snow-hill Station, Birmingham: Travelling Stage for erection of Main Roof Girders.

telegraph offices, waiting-rooms, refreshment-rooms, kitchens, cloak-rooms, stationmaster's office, booking-offices, and bookstalls.

Parcels Yard: Steelwork and Erection.

A large parcels yard has been excavated and constructed at a depth of 24 ft. below rail level, so that the falling gradient of Snow-hill shall permit of direct access from the street. Here, in the sub-basement of the station, are large offices equipped with the most up-to-date appliances for dealing with inwards and outwards parcels, the offices being in communication with the platforms by means of lifts. This part of the new station also provides accommodation for storing luggage and lost property, the parcels, carts, horses, and motor-lorries being accommodated in arches under Great Charles-street.

For the support of the decking above the parcels yard two types of steel columns were used. Those of type A consist of four plates and four angles, and have a sectional area of 62 sq. in., and those of type B are built up of eight plates, eight angles, four tee-bars, and one I-beam. The longest column of type B measures 32 ft., and contains 10 tons of steel exclusive of the grillage, which consists of two tiers of seven 16-in. by 6-in. rolled-steel joists. From an erection point of view there is great advantage in the spreading grillage foundation, for when all the beams are well bolted together the stability secured permits heavy girders to be rested on the columns before the latter are concreted in.

The main girders carrying the three lines over the parcels yard are 90 ft. long by 9 ft. 6 in. deep, the flanges being 2 ft. 3 in. wide. The heaviest girder of this type weighs 59 tons. The cross-girders are 36 ft. in span at 12 ft. centres, and weigh nearly 8 tons each. Between them are 18-in. by 7-in. joists, spaced 5 ft. apart, supporting jack arches.

The erection of the main girders, both on account of their size and weight and the restrictions of the site, necessarily presented some difficulty. The method adopted was to bring them whole to the site, each on a pair of "pollen" waggons, and to place them in position by means of a pair of specially constructed trestles moving on a four-railed track.

Booking-Hall Floor and Roof.

To support the floor of the booking-hall columns of very ordinary design were employed, the superstructure including eight plate girders of 80-ft. span, the largest of these weighing 36 tons. After the columns had been fixed and concreted, the girders were brought to the site on "pollen" waggons, and erected by the aid of a 36-ton crane, sent for the purpose from the Locomotive Department at Swindon. This work was performed on a Sunday, when three of the four running roads were not required for traffic.

A double stanchion at either end of the booking-hall supports two twin girders, each of 80-ft. span and 36 tons weight, on these girders being placed columns, 19 ft. apart, carrying the ribs for the booking-hall roof. The ribs are lattice-braced and in the form of a three-hinged arch of 94-ft. span and 31-ft. 6-in. rise, the centre of the uppermost pin being 54 ft. above road level in the booking-hall. They support lanterns at the top, measuring 17 ft. 6 in. across, and trussed purlin girders at 6-ft. centres. The roof covering consists of ¼-in. rough cast glass and 6-lb. lead, louvre blades of galvanised-iron being fixed to the sides of the lanterns.

Main Roof of Station.

The main roof of the station is of the ridge and furrow type, and is carried on girders running transversely to the direction of the main line. The roof extends from the wind-screen over Great Charles-street bridge at the north end of the train-shed up to the steps of the footbridge, a length of 500 ft., covering about two-thirds of the entire station exclusive of the bay platforms. The remainder of the station is covered by roofs of entirely different designs.

The superficial roof area is about 12,000 sq. yds., the covering consisting of ¼-in. rough cast glass fixed in Mellowe patent glazing bars, and of No. 18 S.W.G. galvanised corrugated-iron, flashed with 5-lb. lead. The distinctive features of the roof are the hips and uncovered portion to a width of 22 ft. over the main line. This has a tendency at times to let in a little weather, but has great compensating advantages in providing free exits for engine smoke and free entrances for fresh air and sunlight. Moreover, it entirely removes that depressing sensation which is so frequently felt in large all-over roofed stations.

Uniformity of design has been carried out as far as the exigencies of the site permitted, the main roof girders being at 35-ft. 10-in. centres, and the roof trusses at 13-ft. 6-in. centres, except for the varying dimensions at the sides.

As will be seen from the illustrations reproduced in Fig. 1, the whole is made exceedingly pleasing to the eye by means of the gracefully-curved elliptical soffits of the roof trusses, the valance boarding covering the centre façia girders and the cast-iron ornamental casings to the columns. The street exteriors are enriched by the provision of ornamental cast-iron cornices and gutters. The cast-iron and glass wind-screens are also very tastefully designed, and thoroughly in keeping with the glazed brickwork and terra-cotta in the street elevations.

The roof columns consist of a pair of 15-in. by 4-in. channels traced together with the plates. These upper columns are for the most part carried on lower columns of box type. The height of the upper columns is 25 ft.; the lower columns are in some cases as much as 45 ft. long, making up a total height of 70 ft. In all there are sixty of these columns supporting the roof.

There are fifteen main roof girders, all of the parallel flanged open-web type, measuring 8 ft. deep and 15 in. wide across the flange. Each of these girders is supported on four columns and made continuous by means of cover plates connecting the tension flanges. The longest of the girders measures 276 ft. from end to end.

The roof trusses, lanterns, and other details illustrated in Fig. 1 are of light but strong design. The sides of the lanterns are covered with galvanised-iron lonore blades, and the ends over the hips are left open. The purlins are of Z and angle sections carrying roof timbers of deal and pitch-pine.

In erecting the roof girders it was found practicable to rivet up on the ground those portions spanning between the outside columns and to lift them into place by a single derrick, except a few of the longer bays on the Snow-hill side, which had to be hoisted on a pair of derricks. The intermediate trusses, purlins, and gutters being relatively light, were hoisted on long derrick poles.

It was, however, a more difficult problem to deal with the central portion of the roof girders spanning the main line, for in this case the work of erection and riveting had to be conducted above a busy site, comprising two passenger platforms and four lines of permanent way, where traffic never ceased day or night.

Consequently the steelwork contractors, Messrs. E. C. & J. Keay, Ltd., had to build a travelling stage, as shown in Fig. 2, of sufficient rigidity and strength to permit the use of a travelling crane capable of raising 7-ton loads. The staging had to be large enough to afford complete protection to the public and traffic beneath, while a bay of roofing was being fixed.

This stage was designed by Mr. C. Barron, who had charge of the steelwork for Messrs. E. C. & J. Keay, Ltd. It consists of three main lattice girders at 25-ft. centres, 9 ft. 8 in. deep and 95 ft. long, the girders being braced to prevent rocking under the action of the crane. The flooring of the stage measures 96 ft. by 67 ft., and is composed of a 2-in. close-boarded decking carried on rolled-steel joists 14 in. by 6 in., at 3-ft. 6-in. centres. The timber trestles supporting the three main girders of the stage are six in number, each consisting of twelve 12-in. square uprights and top and bottom frames, the whole well braced. The fifteen centre roof girders were all erected by means of this stage, which travelled over 500 ft. during the eighteen months it was in use.

Personal.

The works described were designed and carried out by the New Works Department of the Great Western Railway, under Mr. W. Armstrong, M.Inst.C.E., whose resident engineer was Mr. C. E. Shackle, A.M.Inst.C.E. The

contractors were Messrs. Henry Lovatt, Ltd., for whom Mr. R. P. Mears, A.M.Inst.C.E., acted as engineer. The steelwork was constructed and erected by Messrs. E. C. & J. Keay, Ltd., whose resident engineer was Mr. C. Barron.

CHINGFORD RESERVOIR.

In our last issue we briefly referred to the inauguration by his Majesty the King of the new reservoir which has been constructed for the Metropolitan Water Board at Chingford, and in this issue we propose to give some fuller particulars of a work of considerable importance and interest. Some idea of the size of the reservoir may be gathered from the fact that the area occupied is about 500 acres, or a water area of 416 acres, or larger than Hyde Park. The extreme length at water-line is 1¾ miles, and the length of the embankment 4½ miles, while the capacity is about 3,000 million gallons. A short embankment, which has three openings giving free access for water to each side, has been thrown across the centre to prevent excessive wave action during high winds, and the main banks of the reservoir contain about 2,400,000 cubic yds. of earth, etc., of which 253,000 cubic yds. are of puddle. The inner banks are lined with about 105,000 sq. yds. of concrete and brick paving. The reservoir will be filled from the northern end with water pumped from the River Lea, and, after being stored for some time, it will flow through regulating towers into a tunnel and then along a channel nearly 2 miles in length to the distributing basin adjoining the Chingford Mill Pump Station, and thence by existing channels to a chain of reservoirs, twelve in number, constructed under the earlier Acts of the East London Waterworks Company.

The River Lea ran longitudinally through the site of the actual reservoir works, and it has accordingly been diverted into the new channel 3½ miles long, extending from a point north of the reservoir near to Enfield Lock, to the Chingford Mill Pumping Station. This diversion was one of the first parts of the work undertaken, and has been of the greatest utility during the construction of the reservoir, since it efficiently carried off all the winter floods and saved the reservoir works from inundation. An intercepting channel 3½ miles in length has also been constructed for the purpose of collecting surface water from the eastern side of the valley and discharging it to waste into the River Lea below the intakes. In its journey of 2 miles from the reservoir to the distributing basin the stored water is therefore protected from pollution by the intercepting channel on the east and the river diversion on the west.

In substitution for the old and inconvenient Lea Valley-road, which was covered with water in flood-time, a new road has been constructed across the valley between Ponders End and Chingford, and is carried by bridges over the River Lea diversion, the outlet channel, and the intercepting channel. Occupation bridges have also been constructed across those waterways at various points.

The pumping station is at the north end of the reservoir, and the pumping plant employed consists of an installation of "Humphrey Pumps," in which the action of the internal combustion cylinder is directly applied to the raising of water. The pumps have been designed by the inventor, Mr. H. A. Humphrey, M.Inst.C.E., of the Pump and Power Company, Ltd., and constructed by Messrs Siemens Brothers Dynamo Works, Ltd., of London and Stafford. The economy of these pumps results from the employment of the internal combustion principle, and, as the explosion takes place in direct contact with the water to be lifted, there are no transmission losses. Each pump may be looked upon as a gas engine and pump combined, but without piston, crosshead, connecting-rod, crank shaft, flywheel, bearings, gearing, or stuffing-boxes. The five Humphrey pumps erected at the reservoir include four large units and a smaller one. Each large unit is capable of delivering 40 million gallons of water per day. The small pump is of one-half that capacity, and the total installation will therefore deliver 180 million gallons per twenty-four hours.

"The action of the pump," to quote from the interesting brochure issued by the Metropolitan Water Board on the occasion of the inauguration ceremony, "can be best understood by picturing a horizontal pipe, connected by two bends at its ends with a vertical closed top combustion-chamber and an open top water-tower respectively. The parts thus connected are nearly full of water, forming a heavy mass or column, which is made to oscillate under the action of the explosion. This oscillation is quite free, and occurs in such a manner that the movement of the water causes the intake of a fresh combustible mixture, the compression of the mixture, the explosion and expansion which give the power stroke, and the exhaust of burnt products. There are thus four primary movements of the water during each cyle, two being from the combustion-chamber towards the tower and two in the opposite direction. The success of the pumps is due to the use of the momentum acquired by the moving mass of water, for it is this momentum which enables the outward swing of the water under the action of an explosion to continue after the expansive force of the gases has finished, and thus to draw in scavenging air and to cause the intake of fresh water from the low level during the first outward stroke. On the first inward stroke, which takes place under the head to which the water has been lifted, the column of water is allowed to acquire velocity and momentum while merely exhausting the burnt gases, and then the momentum is utilised to compress a cushion of scavenging air imprisoned in the top of the combustion-chamber above the exhaust valves. Energy is thus stored in the compressed cushion, and this cushion expands, giving the second outward stroke, and again it is the momentum which is relied upon to carry the water column far enough to draw in behind it a fresh mixture of gas and air. The second return stroke now takes place and the explosive mixture is compressed, and once more, owing to momentum, the compression pressure far exceeds that which would be due to the static head of the liquid and thus permits a high thermal efficiency.

The only working parts are the valves, and of these the admission valves for combustible mixture and the exhaust valves for burnt products are placed in the combustion-chamber, and the valves for admitting fresh water are placed circumferentially round a vertical valve box situated between the combustion-chamber and the bend which connects to the horizontal pipe.

To give some idea of the size of one of the larger pumps, it may be mentioned that the combustion-chamber and valve-box are both 7 ft. diameter, and the bend connecting them with the horizontal pipe is 7 ft. diameter on one face and 6 ft. diameter on the other face. The horizontal pipe is 6 ft. diameter throughout, and the vertical tower at the other end gradually increases in the shape of an inverted cone until it is 15 ft. diameter at the top. If a person passed from end to end inside the apparatus, he would find a perfectly clear and unobstructed waterway, and it would look more like a big empty pipe than a piece of machinery. On each explosion in one pump 12 tons of water will be taken out of the River Lea and delivered into the reservoir.

The pumps can be stopped and started instantaneously by merely controlling a switch on the electric ignition circuit, so that it is possible to have all five pumps at rest one moment and yet all working at full load half a minute later."

The reservoir, river diversion, bridges, roads, pump-house, cottages, and other buildings and works were designed by the Water Board's Chief Engineer, Mr. William Booth Bryan, Mem. Council Inst.C.E., and have been constructed under his supervision by Messrs. Charles Wall, Ltd., contractors to the Board. The cost of the works amounts to some £550,000.

INSTITUTION OF HEATING AND VENTILATING ENGINEERS.

THE annual general meeting of this Institution was held recently at the Holborn Restaurant under the chairmanship of Mr. J. E. Hartley.

After formal business had been transacted the President gave a short Presidential address in the course of which he said that the influence of the Institution had been felt not only in this country but in the most remote parts of our great Empire. They had now members in Australia, New Zealand, America, and other lands. They were now being asked to give guaranteed results of installations in a way which was hardly dreamt of when their Institution was founded. They were a progressive Institution and would make an effort during the current year to bring their numbers up to 500. Their efforts had resulted in the subject of heating and ventilating being taken up by the City of London Guilds and by various technical schools in the country, and they had been able to found a scholarship in London University for research work. In conclusion the President referred to the extension of heating and ventilating science in countries which were hardly looked on as favourable fields for such work, and instanced a great barracks in Siberia as being warmed by apparatus of English workmanship.

ANCIENT ROMAN VENTILATING AND HEATING ARRANGEMENTS.

Mr. John Jeffreys contributed a description of the heating and ventilating arrangements at the ancient Roman villa at Chedworth, Gloucester. He said it was believed that no satisfactory solution had been furnished of the method employed by the ancient Romans in warming and ventilating the villas built by them during their occupation of this country extending over a period of 465 years from the invasion of Cæsar, 55 B.C. to A.D. 410. The Roman villa at Chedworth was an interesting example of its kind and might be cited to illustrate the provisions that had been discovered for heating and ventilating the homes of wealthy Romans in Britain.

It was originally a building of one story built of limestone from an adjacent quarry with a concrete floor supported on pilæ about 2 ft. apart and 3 ft. high forming a shallow basement, at one end of which still existed the hypocaustum or heating furnace approached by outside steps, the floor of the chamber being about 5 ft. below that of the basement.

The furnace, constructed for burning logs, consisted of a long flat table breast high with enclosed sides and open ends on which probably iron or pottery supports were placed to carry the fuel. Nothing of the kind, however, remained at the present time, although the skill of their artificers in working in metal was shown by the number of iron utensils for domestic use, articles of cutlery, etc., found on the site, and also by the discovery of a smithy and anvil, with an ingot of iron lying alongside just as left by the last craftsman.

The back of the furnace was level with the basement and when the fire was alight heat and smoke pervaded the whole space under the floor, warming it and the supporting pilæ There was nothing suggestive of a smoke shaft anywhere nor of hollow spaces in the external walls for the passage of heated gases common in similar buildings in Rome, but on the four sides were holes in the outside walls near the ground which presumably afforded egress for the smoke.

It might be surmised that means existed of baffling or closing these openings in unfavourable winds to prevent the smoke escaping without warming the floor, nevertheless it was difficult to understand how the heat could have been evenly transmitted over such an extensive area, and this gave rise to the suspicion that the system was at times more or less inefficient. In the internal walls of the principal rooms were vertical flues made of pottery communicating with the smoke chamber in the basement, and having inlets to the rooms, the use of which was conjectural, theories hitherto advanced concerning the use of these inlets being unsatisfactory for the reason that if they had been left open when the fire was alight smoke would have found its way into the rooms to the discomfort of the occupants.

He had given considerable attention to this subject and from personal inspection of the site was of opinion, which he believed had not been previously advanced, that the flues were used only at night, the inlets to the rooms being closed while the furnace was alight during the day when the family would be frequently engaged in out-of-door avocations. With the approach of evening the fire would be allowed to die out, by which time the floor and pilæ would be sufficiently heated to retain enough warmth to last through the night when the openings in the external walls, previously described, would automatically act as inlets for fresh air which, warmed by contact with the heated pilæ and floor, would enter the rooms through the flues in the internal walls, so affording ventilation as well as warmth.

It was worthy of note that this principle survived in the old-fashioned baker's oven at present in use in the more remote parts of this country, the oven being heated by faggots burned inside the chamber, which were removed

when the walls are hot enough to bake the bread.

Nothing remained of the original roof of the villa at Chedworth so it was impossible to say if any provision existed for exhaust ventilation other than that from windows and doors. It was known that the ancient Romans were acquainted with the use of roof ventilators, as such appliances had been found in the ceiling of the Public Baths at Pompeii, the roof of which was intact. Also in the Laconicum or hot chamber of the hot air baths in Rome a ventilator existed in the roof to moderate the temperature. It was also recorded that hot air baths were invented by the Lacedemonians, the Laconicum being called after them, from which it appeared the use of roof ventilators was previously known to the Greeks.

The Laconicum, previously referred to, was usually a high and narrow circular structure built into or suspended over the furnace and in one side of it was an opening communicating with the fire fitted with a movable damper called the clypeus, the use of which had never been satisfactorily explained, as a person occupying the chamber would probably have been buried alive had the damper been incautiously opened, while with the roof ventilator open at the same time, flame from the furnace would have passed directly into the room, therefore it might be assumed that the damper was used only to warm the room before the bather entered, a theory that accords with the suggestion previously made with reference to the heating apparatus. The wealthier Romans, in addition to warming their houses, also warmed the water for their baths, and private baths were always attached to their dwellings, a custom copied from the Greeks, who, according to Homer, indulged in a warm bath after violent exercise.

The earliest record of Public Baths in Rome in which hot water was provided dated from the time of the Emperor Agrippa 21 B.C., although public swimming baths were in existence as early as 312 B.C. At a later period, A.D. 217, the Public Baths of Caracalla were constructed. These were magnificent buildings arranged with internal courts covering an area of one-sixteenth of a square mile and containing marble seats for 1,600 bathers, while the Baths of Diocletian (A.D. 302) had seating accommodation for 3,200 persons.

Brass and lead pipes were freely used for the conveyance of hot and cold water. These pipes were usually made by folding and pressing together the edges of the axial joints. At Chedworth a 4-in. lead bath waste pipe similarly constructed was still in position when he first visited the building fifteen years ago, but has since been removed to the museum. As the pressure was inconsiderable such pipes may have answered fairly well for a time, but it might be surmised that leaks were then, as now, a not infrequent occurrence. The inability of the Romans to manufacture pipes of sufficient size and strength to withstand pressure accounted for the building of the gigantic aqueducts by which ancient Rome was supplied with water. It was known, however, that the Romans were acquainted with the fact that water would rise to its own level at the time these aqueducts were constructed.

The water for their baths was heated over a furnace in a series of copper vessel sometimes fixed horizontally from the front to the back of the fire and connected together by pipes. The cold water was furnished from the aqueduct to the vessel most remote from the flame and when hot water was drawn from the boiling vessel it was automatically replaced with warm water from the adjoining one, which in turn was replenished from the vessel fed with cold water at the back of the fire, so utilising the heat of the furnace to the best advantage. Pipes also led from each vessel independently to the bath to allow of hot or tepid water being drawn off. The Public Bath discovered at Tusculum had two such vessels fixed one above the other in a vertical shaft resembling a flue, the mouth of which was stopped by the upper vessel so, presumably, the smoke found an exit through hollow spaces in the wall to the atmosphere, an arrangement not altogether conducive to a good draught.

It was interesting to find how thoroughly up-to-date the ancient Romans were in their methods of heating and hot water supply considering the limited means at their disposal, and it remained for the modern engineer to adapt to present requirements their system of warming the external walls of a building by means of smoke flues. That this could be done with the assistance of mechanical extraction there was every reason to believe, but no opinion was offered as to whether it would be economical or otherwise. A point worth noting was that no attempt seemed to have been made by the Romans to warm their buildings by means of hot-water pipes buried in the walls; possibly however, they knew too much of the vagaries of hot-water in pipes to make the experiment.

Mr. L. Pearson remarked how interesting were the wonderful methods adopted by the Romans and also how interesting it was to speculate on what stopped their progress. Houses built in England 100 years ago were far behind the heating and ventilating facilities enjoyed by the Romans.

Mr. Grey observed that he had read a description of what looked like a hot-water boiler discovered in Pompeii.

A hearty vote of thanks was passed to the author of the paper.

HEATING OF HOUSES OF THE MIDDLE CLASSES.

Mr. B. Tice read a paper on the subject of "Why are the Houses of the Middle Classes so Seldom Heated by Hot Water?" He pointed out how rarely it was that a hot-water heating installation was found in the city man's ten-roomed villa, the doctor's house, the rectory, the vicarage, or even the fine old manor houses. Particularly in the garden city neighbourhood decent-sized houses were springing up like mushrooms, but it was the exception to find hot-water heating apparatus, or even any provision for its future instalment by the occupier. From personal experience, whether obtained by interviewing owner, architect, or prospective tenant, he had invariably found that the neglect of this important requirement was due to the following reasons: (1) Imperfect knowledge of the many advantages and beneficial results obtained from heating by hot water, compared with the ordinary open fire; (2) exaggerated ideas of the initial cost and subsequent upkeep of a heating installation; (3) that it is an unhealthy form of heating, provocative of general discomfort and a nauseating stuffiness of atmospheric conditions in all the rooms of the house, with a consequent proclivity to colds on the part of the inmates; (4) that in some occult way it is responsible for many of the outbreaks of fire, described in the daily Press "as due to a defective flue of the heating apparatus." With regard to getting over the first difficulty, he suggested that a publication department might be formed under the auspices of the Institution to spread the light of things pertaining to heating. His second point of the exaggerated idea of cost was perhaps the greatest difficulty to be faced, but in regard to this much might be done by the architect and engineer to lessen costs, and one method was to do away with the sunk stoke-hole. In meeting the third objection as to the atmospheric discomforts occasioned by heating installations, he advised that the engineer should use his own home and office as a text to show that preaching and practice did sometimes go hand in hand. It was comparatively easy to deal with any objections as regarded fire risks, as the dangers of open fire were so very apparent even to those who clung to the old extravagant method of warming.

Mr. Jones called attention to the practice of architects asking them to fix heating apparatus to flues which were much too small. He thought they ought to take a stand against it

Considerable discussion resulted from some observations by Mr. Barker as to the ill-effects from overheating houses, and Mr. Jones, Mr. Pearson, the Chairman, and others gave their personal experience of immunity from cold owing to living in hot-water heated houses.

Mr. Barker said he agreed as to the desirability of a properly heated house, providing that there was proper ventilation, and he advocated the retention of the open fireplace where there was a hot-water installation.

WARMING, ETC., OF OPERATING-ROOMS.

Mr. W. W. Nobbs, in a paper of considerable length, dealt exhaustively with the construction of and the warming and ventilation of an operating-room for a general hospital of 400 beds. For pure heating, he considered the most suitable form of apparatus would be a gravity circulation low pressure hot-water installation, the mains being brought direct from the boiler in basement (*i.e.*, without any branch circuits being taken off). If, in addition, these warming pipes were disposed within the walls of the operating-room, warming the walls by conduction, practically ideal conditions were assured: thus with no apparatus obstructing the walls, floor, or ceiling of the operating-room, the whole room could be washed down with a hose.

THE CONCRETE INSTITUTE:

THE STRENGTH OF CEMENT.

A MEETING of the Concrete Institute took place on the 13th inst. at Denison House, Vauxhall Bridge-road, S.W., when a paper was read by Mr. H. C. Johnson, Demonstrator in Engineering at the University College, Cork, entitled "The Strength of Cement. Results of Tests on Fifteen Different Brands used in Paste, Mortar, and Concrete." Mr. F. Fiander Etchells, F.Phys.Soc., M.Math.A., A.M.I.Mech.E., M.Council C.I., was in the chair.

The following is an abstract of the paper:—

The main object in writing this paper is to show the wide range of strengths as indicated by these tests. To many people it is undoubtedly a fact that any bag marked "Portland Cement" is just as good value as any other bag so marked, and also that:—(*a*) The cheapest cement is the most economical to use; (*b*) testing a cement with a "name" is unnecessary; (*c*) the value of fine grinding is not considered, even if its advantages are known; (*d*) the paste tensile seven days' test is quite sufficient guide to a cement's value as a "binding" material.

That these conclusions are erroneous the author will not be the first to point out. The results of these tests are, therefore, put forward with the object of calling further attention to the importance of testing all materials entering into constructional works, in which they will be called upon to do their duty, with a predetermined factor of safety. This factor, if due attention be paid to excellence of materials in every particular, may reasonably be reduced from the customary 4 or 6 to 3 or 4½. The term "paste" here used means neat cement and water. The term "mortar" means one part cement to three parts standard sand and water.

From the detailed results of his experiments the author drew the following conclusions:—

1. That a good strength in paste is no proper indication of a good strength in concrete.

2. That the best tests of a cement's value for reinforced concrete or similar work are (*a*) mortar compression cured in water; (*b*) mortar compression cured in air; and, in addition to having to show a certain strength, any cement having a higher value in air than in water to be condemned.

3. That not less than 22 per cent. of water be allowed in gauging paste, and not less than 3 per cent. plus quarter the percentage as used in the paste, in gauging mortar.

4. That the standard of values for cement to be used in reinforced concrete work be raised by 25 per cent., not that a cement only just passing the British standard specification is to be condemned for average work, but in order that first-class cements only shall enter into reinforced concrete structures; engineers may then reasonably expect to be able in the near future to use 1,000 lb. per square inch on concrete instead of 600 lb.

5. That for a given expenditure on cement a first-class one will allow a saving, since there will be:—(*a*) Less cement to pay carriage on; (*b*) less cement to handle; (*c*) less sacks to clean, tie up, and return; (*d*) with at least as strong a concrete.

6. That a given strength of cement should be specified, instead of a given mix—which does not take into account the proper proportioning of aggregate, even if a cement of first quality is used.

7. That cement should be sold by volume instead of by weight, and in bags containing 1 cubic foot, to allow of quicker and easier handling. These bags should be made of paper for preference, this being the common practice in the United States. Among the advantages the author noted that paper bags have over canvas ones are:—(*a*) No time is lost in shaking out the cement; (*b*) no cement is retained by the sacks; (*c*) there is no return freight on empties; (*d*) the packages are better looked after in storage; and (*e*) cement is kept in better condition.

The reading of the paper was succeeded by a discussion in which the following took part:—Mr. D. B. Butler, A.M.Inst.C.E., F.C.S.; Mr. H. J. Harding; Mr. H. Kempton Dyson, Secretary of the Concrete Institute; Mr. W. Cyril Cocking; Mr. Noel Ridley, M.Inst.C.E.; Mr. Herbert Shepherd, A.R.I.B.A., M.C.I.; and Mr. E. Fiander Etchells, F.Phys.Soc., M.Math.A., F.C.S.

The following were elected members of the Institute:—

Mr. W. Cyril Cocking, London; Mr. W. A. Green, M.A., B.Sc.Eng. (St. Andrews), A.M.Inst.C.E., London; Mr. A. Percy Harcourt, London; Mr. H. C. Johnson, Cork; Mr. T. A. Jones, London; Mr. John H. Kerner-Greenwood, Kings Lynn; Mr. R. J. Lecky, M.Can.Soc.E., Regina, Canada; Mr. A. V. C. Lima, Cert. Eng. Liverpool University, Liverpool; Mr. Albert Edward Marshall, London; Mr. G. Y. Randall, Hull; Mr. Archibald Scott, A.R.I.B.A., Edinburgh; Mr. F. R. Wade, A.M.I.Mech.E.

It was announced that the Council had admitted the following as students of the Institute:—

Mr. Alfred H. Ashdown, London; Mr. M. B. Powell, B.A. (Cantab.), London.

ENGINEERING NOTES.

Waterproofing Concrete Floors and Roofs. In cases where concrete floor or roof slabs have proved troublesome by reason of porosity, the Aberthaw Construction Company, of Boston, U.S.A., have found that the penetration of water can be prevented or reduced to a minimum by the use of boiled linseed oil thinned down with gasoline. As an instance of the benefit so obtained, it is stated that certain concrete roof slabs constructed to cover delicate instruments were found to be leaky owing to the porous nature of the material, and that a permanent cure was effected by the application of boiled oil and gasoline. The same treatment is said to be equally satisfactory for brick walls.

Deposits with Tenders in Canada. In a recent issue of the *Times Engineering Supplement* some remarks were made appearing to constitute an apology for the continuance of the system of deposits with tenders for engineering works in the Dominion. It is not easy to see why such a system should have been thought necessary or why it should be allowed to continue. A small deposit may reasonably be asked on the issue of specifications and copies of drawings, so as to discourage the demand for particulars except from firms who intend to submit *bonâ fide* tenders, but there is no justification for demanding substantial deposits when such tenders are lodged. Contracting firms do not prepare estimates for their own amusement, and in ordinary circumstances are not at all likely to refuse work which they have endeavoured to obtain at considerable outlay to themselves. If any guarantee is required for the proper execution of a contract, this can easily be provided by a bond from one of the guarantee societies undertaking risks of the kind. We are quite in accord with the feeling of Canadian contractors that the time has come for the abolition of a system which is not only of no practical utility, but at the same time involves the unprofitable use of capital to a very considerable extent.

Test of a Large Wire Rope. Portions of a wire rope, 7,810 ft. long and weighing 56 tons, that has been used in Cuba for lowering trucks containing about 45 tons of ore each down an incline of 5,800 ft. long, were recently tested at Lehigh University. The object of the tests was to determine the loss of strength due to actual use extending over eighteen months. Therefore pieces cut from the cable and other pieces that had not been used were tested to destruction, the test specimens being 20 ft. long in each case. It was found that the new cable broke under the tensile load of 325 tons, while the worn cable withstood a load of nearly 270 tons. This rope consists of six strands of nineteen wires, each twisted around a hemp core, with six outer strands of nineteen wires, and is said to be the most powerful wire rope hitherto made.

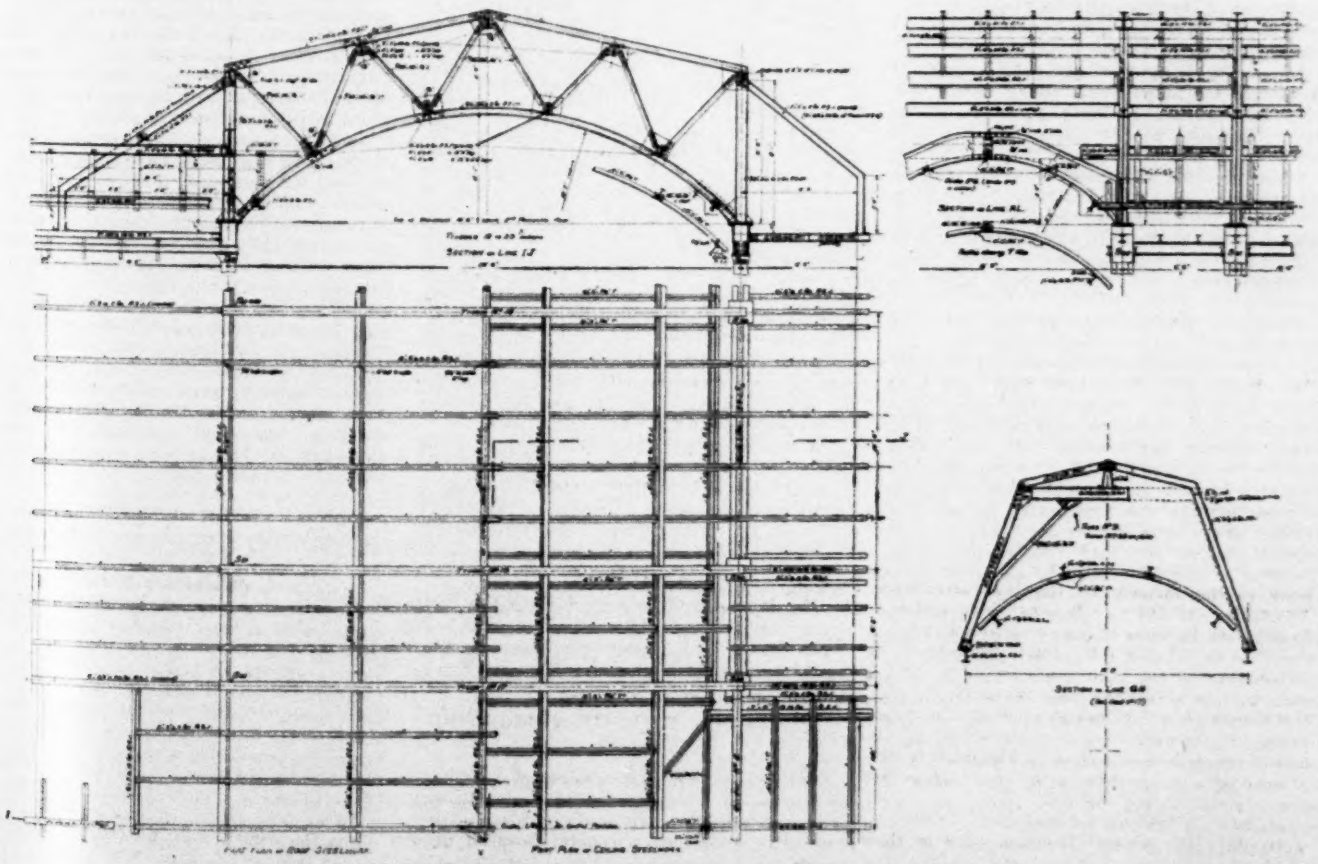
Skyscrapers and Fire. The *New York Times* quotes from a report made by Herr Quedefeld, who is attached to the German Consulate-General in New York, and who is an expert in building engineering, on the advisability of introducing the skyscraper into Germany. The report is one of the most convincing condemnations of high buildings that we have ever seen, and as such deserves notice.

Although skyscrapers may be themselves incombustible, they are often packed with combustible material where fire may obtain plenty of nourishment. Nor is this all; the cellars which contain the boilers and engine plant are packed with immense quantities of fuel and packing-cases, and very frequently gasolene and petroleum.

As soon as a fire arises the elevator shafts are converted into immense chimneys, the elevators put out of action, and the sole means of escape is frequently limited to staircases of small width, often winding round the elevators, and therefore totally useless. In addition to all these dangers as the New York Fire Department can only throw up water as high as the seventh story, or a height of 91 ft.; the remainder of the building can only be served from a water tank placed on top, which may be empty. In spite of the fact that outside staircases and balconies are now being made compulsory, Herr Quedefeld concludes that the dangers attendant on this form of building are too overwhelming to render its sanction in Germany reasonable.

Extension of the Galveston Sea Wall. An important extension is about to be made of the sea wall at Galveston, U.S.A., at an estimated cost of about a million sterling. The object of the wall is to permit the level of a further area of land to be raised above the sea level, and it is stated that the elevated area so provided will be sufficient for accommodating practically double the present population of 41,000. The extension will form a continuation of the existing wall, which was completed in 1906 for a distance of 4½ miles along the city front, as a protection against flooding in times of storm and high tides.

Coal-Gas as a Fuel for Domestic Purposes. The second of the Cantor lectures was delivered by Mr. F. W. Goodenough before the Royal Society of Arts on March 10. "Coal-Gas as a Fuel for Domestic Purposes" was the general theme of this series. In his second lecture Mr. Goodenough dealt with gaseous fuel for cooking purposes; the question of hot water supply; the various types of gas water-heaters; the instantaneous storage and circulating systems of hot water supply; and miscellaneous domestic applications of gaseous fuel. Each point made by the lecturer was amplified and emphasised in its relation to hygiene and economics. A reference was also made to the use of gas for garage and greenhouse heating.



The National Library of Wales, Aberystwyth.

Mr. S. K. Greenslade, F.R.I.B.A., Architect.

(Section of main roof to Library Hall, showing truss. Other details of this building were published in our issue of March 14.)

THE BUILDING TRADE.

RIGHTS OF LIGHT AND PUBLIC WRONGS.

LAWS made by man fall under one of two heads—those which are for the benefit of the community, and those which, rightly or wrongly, tend to preserve privileges which may in many cases be detrimental to the general interests of the community.

Of such a nature were the old game laws, and many of the customs and laws prevailing in France before the Revolution, but short of such obviously oppressive enactments there are many minor measures which, protecting as they do privilege, are opposed to the common weal. Our system of land tenure under which it is impossible over great areas in London to obtain a freehold title are held to be responsible for much of the indifferent building which obtains in London and other of our great cities.

It does not encourage any man to build for eternity if he can only secure a ninety-nine years' lease. But a man at least knows what he is undertaking in such cases, and considers his expenditure accordingly.

But it is otherwise with the case of ancient lights. The man who is building can seldom in complicated and difficult cases know how far his neighbour may hamper the development of his site. To raise such questions at the outset is frequently to create difficulties which would not occur. The best expert advice he can obtain will not ensure safety; the Courts may in any case take a point of view which will unduly hamper him.

If the only question involved were one as between two private individuals, such uncertainty would be bad enough, but the evil does not end there, but inflicts injuries on the general public by increasing the irregularity and decreasing the beauty of our streets.

We must assume that the provisions as to heights of buildings, open-air spaces in rear of them, and similar limitations which are contained in local by-laws are considered to be sufficient to ensure the health and amenities of our towns.

Why, then, should any man have the right to dictate the height to which buildings which are built on adjoining land shall be carried up irrespective of these by-laws, and irrespective of the fact that he has no rights of ownership over adjoining property?

Because a man has enjoyed exceptional advantages for many years owing to the low height of a neighbour's building, we can see no reason why such exceptional advantages shall be secured to him in perpetuity.

A case in point which may be quoted is that of the new Wesleyan Church House, the proper completion of which may never be possible because of the rights of light which the present and future owners of the site of Westminster Hospital possess, and many more might be quoted.

When we consider that in Scotland such rights do not exist we cannot claim that they are the necessary accomplishments of civilisation.

We know how frequently they are used simply as a ready means for extorting compensation, in the full knowledge that little or no actual damage has accrued. We are aware that the law as it is framed at present affords a source of income to surveying experts and to lawyers, but the real question to be solved is whether or not such enactments conduce to the general weal or not, and whether or not an alteration in the law would be an interference with the rights of private ownership.

We believe it will be clear to all those who think the matter over that such is not the case. It may be urged that all public authorities are now anxious to preserve rights of public way across private properties, but here the cases are not analogous. Such rights of way are not a private but a public convenience, which have received the sanction of time and usage, but in the case of ancient light it is a question of private right *versus* private right, coupled frequently with the public interest.

A building maimed by the enforcement of the law of ancient lights is frequently a building deprived of architectural quality it would otherwise have had; it is also certainly a building with a smaller rateable value than it would otherwise possess.

METHODS OF TESTING CLAY.

A REPORT issued by the Canadian Department of Mines contains an account of the methods adopted for ascertaining the physical properties of clay and shale deposits and their value to firms engaged in the manufacture of clay products.

In the subjoined notes we have omitted matters of purely local interest, our object being to indicate the general aspects of an investigation such as might be taken up with advantage in this country.

Tensile Strength.—The determination of tensile strength is useful as giving an index to the ability of clay to withstand strain before burning, and possibly also to its bonding power, or suitability for the addition of non-plastic material. Briquettes for this test were prepared by mixing dried, ground, and sifted clay with enough water to ensure the maximum plasticity, the material being clamped into the mould so as to fill it completely. When hard the briquettes were dried at the temperature of 100 deg. C., and broken in an ordinary tensile testing machine.

Shrinkage.—To test air shrinkage, or that occurring while the clay is drying, briquettes measuring 4 in. by 1½ in. by ¾ in. were moulded and marked by two fine lines 3 in. apart, measurement of the distance being made after the specimens had been thoroughly dried. To test fire shrinkage, similar briquettes were measured after successive firings in a muffle kiln.

Fusibility.—This property was determined by heating small cones of ground clay in a gas-fired muffle kiln until they were melted or deformed, the fusing temperatures being carefully registered.

Absorption.—Briquettes measuring 4 in. by 1½ in. by ¾ in. were carefully weighed after successive firings and immersed in water to the extent of three-fourths their thickness for at least twenty-fours, and then weighed to ascertain the amount of water absorbed.

Rapid Drying Test.—Clay used for this test was ground to pass a 12-mesh sieve, kneaded with water to a stiff mass and moulded in an ordinary brick mould. The moist bricks so prepared were at once placed in a drying-chamber kept at the temperature of from 120 deg. to 150 deg. F., and if the bricks cracked it was concluded the clay would not stand rapid drying.

Experiments on Defective Clays.—Some varieties of fine-grained and highly colloidal clay were found with the serious defect of "checking" in the process of drying, although showing fairly low air and fire shrinkage and burning well. Experiments were made in order to devise means of rendering such clays workable in districts where they were the only available material for drain-pipe and paving-bricks. The addition of sand up to 25 per cent. caused no diminution of the cracking, and, although this could be avoided by adding from 40 to 50 per cent. of sand, this proportion was too much for the bonding power of the clay, and the product, after burning, was too weak and porous.

The experiments showed that by grinding and calcining the clay, the calcined material could be added to the raw clay, instead of sand, in quantities large enough to cure the "checking," and that the product was quite satisfactory. The calcined clay acts in the same way as sand in the first stages of manufacture, and is vitrified together with the raw clay during the process of burning, instead of remaining inert, as happens when sand is employed.

Further experiments in pre-heating showed that if clays of the kind mentioned were heated to from 300 deg. to 500 deg. C. they lost excessive plasticity, becoming suitable for working by the stiff-mud process, and for moderately rapid drying.

Additional experiments were undertaken for the purpose of devising means for reducing the amount of water in mixing and for assisting the removal of moisture from the body of the clay during the drying process. It was found that most cases of cracking could be cured by adding from 1 to 2 per cent. of hydrochloric acid to the mixing water, or by mixing from 1 to 2 per cent. by weight of common salt to the dry clay. The amount of water required for tempering was reduced by about 10 per cent. by the addition of salt, and the bricks so treated dried perfectly in four hours at a temperature of from 70 deg. to 80 deg. F., but would not stand rapid drying.

The results of these experiments are sufficient to indicate the valuable nature of the investigation undertaken by the Canadian Department of Mines for the benefit of the clay-working industries.

FACILITATING CONTRACT WORK.

As most of our readers are aware, the contract prices for important works are not infrequently higher, and the contractors' net profit lower, than is desirable owing to the inadequate nature of the information forming the basis of tenders, and to various unforeseen contingencies. In the interest of contracting firms the methods adopted by an American railway company are clearly deserving of study in this country.

The company in question make a point of considering matters from the standpoint of the contractor as far as possible, trying to put themselves in his place when writing specifications, asking only for what can reasonably be expected, and taking special pains to make all requirements very clear and definite. Local conditions affecting, or likely to affect, the execution of works are stated, as are the available facilities and the difficulties that may be anticipated. The experience of the company is that by providing information of this character the tenders received are invariably lower than they would be in the ordinary kind of specification, under which the contractor has to work more in the dark, and is responsible for unknown possible risks that may involve serious outlay on his part.

In bridge construction the greatest economy attainable is generally in the work of erection, and, with the object of securing this, the company study the ground carefully and outline a satisfactory method of erection, while permitting the adoption of any approved alternative method. Thus all contractors tender upon a uniform basis for erection as well as for actual construction. Moreover, any firm having special plant suitable for the particular work may make a lower offer, with the probability that the contract will thereby be secured at a price satisfactory to both parties.

In many cases the contractor has been invited to a conference with the engineer before the delivery of steelwork, in order that local conditions may be examined and plans formulated for erection, the results generally attained being greater rapidity and economy than could have been secured without the co-operation of the engineer.

While admitting that the conditions governing the execution of railway work are not exactly on all fours with those attending building operations, we feel sure that architects might frequently save considerable amounts for their clients, and at the same time benefit contracting firms by applying the principles favoured by the railway company to which reference is here made.

HOW TO PREVENT DERRICK ACCIDENTS.

NOTWITHSTANDING the care taken by building contractors in the erection of derricks and hoisting machinery, mishaps of more or less serious character occur from time to time. Consequently, it is desirable that the causes of such mishaps should receive careful attention. Apart from accidents due to faulty design or imperfect construction, failures may arise from the overloading of the plant, insecure methods of attaching the load, or from carelessness or want of skill on the part of attendants. It is not enough for a derrick to be in perfect order at the time of erection. The appliance should be inspected and adjusted, if necessary, every day by a competent mechanic; and its safe hoisting load should be written in a conspicuous place so that there may be no excuse for

overloading. Manila ropes suffer deterioration, and are apt to be damaged by fraying or cutting action, while chain slings may fail owing to the fracture of a single link in consequence of transverse strain. The risk of slipping should be minimised by the judicious application of clamps, and devices should be employed in making the main connections on ropes and tackle.

RECENT PROGRESS IN PAINTERS' MATERIALS WITH SPECIAL REFERENCE TO HYGIENIC PAINTS.*

"I MUST now turn to a consideration of those pigments which may be used instead of lead. They are all zinc compounds and are non-poisonous. By far the most important is zinc oxide. Now, this material has been known and used for many years past. It was invented in 1781, and since that time the manufacture has been vastly improved. It is made by burning spelter or metal zinc, the result being dense fumes which, on cooling, yield a fine white powder, which is collected in bags and forms the zinc oxide of commerce.

Zinc Oxide.

To-day zinc oxide is without doubt the standard white pigment. It is made in England and in France, Belgium, Holland, and the United States of America, and the consumption to-day in England alone is probably 20,000 tons per annum. In America the annual consumption approaches 70,000 tons. Zinc oxide is the sole pigmentary base of all the best white enamels ; its durability is remarkable, particularly when used on the seashore, the very place where lead fails. In a letter written to one of the London daily papers recently a gentleman voiced the opinion that if white-lead were prohibited ships would be sent to foreign ports to be painted. That particular gentleman did not quite know what he was talking about ; as a matter of fact, zinc oxide is very largely used in ship painting, and has been for many years. A peculiar fact concerning it which is worth the attention of architects is this : When mixed with linseed oil and turpentine in the ordinary way the odour is much less pronounced than is the case when lead is used. I am unable to offer an explanation of this, but such is the fact. It is exceedingly fine, a quality which goes toward its durability, it being well known that the finer a pigment is the longer it will last, and it is a pure white, white-lead being comparatively yellow beside it. It can be mixed with any other pigment or colour, including ultramarine, cadmium, and so on, without affecting them or itself being affected. The price to-day, I believe, of zinc oxide is about the same as that of dry lead, but really it is cheaper, as I shall presently endeavour to show. The fact that sulphur does not affect it is manifestly in its favour—the fact that it is non-poisonous is well recognised ; and I might mention, in passing, that some few years back I had pleasure in going over a zinc oxide factory in Belgium, where I saw men packing the dry material in casks and stamping the oxide in. Most of these men were literally covered with the white material from head to foot, yet I was told there was never a case known of poisoning. The purity of the white is a very great advantage in mixing colours, as will be obvious at a very little consideration. Being fine, it requires a good deal of oil to grind it, and when properly mixed it covers, or spreads, at least one-third greater surface than white-lead does. This is a point which is greatly in its favour, and must always be taken into consideration when a comparison of prices are made. To make this quite clear, let us suppose that we take one ounce each of lead and zinc oxide, mix them separately into a paint of the proper consistency—by which I mean the degree of fluidity which a practical and experienced painter would use in painting wood or other work ; then take a small clean brush for each, paint on a board side by side until every drop has been used up, and we shall then find that the zinc has covered, as I have said already, at least one-third greater space than the lead. This spreading capacity is one which is frequently overlooked in calculating the price of painters' materials. Red-lead, for instance, has about one-half the spreading capacity of zinc—much less, therefore, than white-lead.

The next point to be considered is the body of the paint; by "body," I mean the opacity, or the property of hiding the surface to which the paint is applied. Many who have only tried zinc oxide in a slipshod way claim that it it deficient in this quality. I have endeavoured to show by the boards exhibited that this is an error. When properly mixed it has quite as good body as lead, but, unfortunately, many painters do not know how to mix it, hence the failure in this respect. If patent driers are used it is certainly ruined. In the first place, many of these driers contain lead; and, in the second place, as already pointed out, they are at least four-fifths barytes, or chalk, which has little or no body—in fact, it is utterly absurd to endeavour to get a good result by using paste driers. Zinc, manganese, or cobalt driers in liquid form must be used. I recommend, however, in addition, that for white work refined boiled oil be used ; this, of course, is in itself a drier, and a very good one. The ordinary boiled oil is used outside sparingly by most painters, but when it is refined I have never found it to have any bad effects.

But even if the zinc oxide should be slightly deficient in body, and it was necessary to give four coats to the work instead of three of lead, even then I claim that it or its equivalent should be used. Surely it is better to use an extra coat of paint than it is to poison our operatives ?

As to its durability, when there is much sulphur in the air, as in smoky towns, zinc oxide has a distinct advantage over lead, but even in the pure country air it is superior in this respect. In cases of doubt I recommend the addition of a small quantity of good outside varnish to the paint, which will give a long-lasting paint under most conditions. Mr. J. Cruickshank Smith, in his book on "Zinc Oxide," estimates that in twenty years oxide of zinc and red-lead will require renewing four times, white-lead five to six times, and iron oxide seven times. Worked out on this basis, and allowing for the difference in covering power, he calculates the relative cost of painting and renewing per coat per 100 sq. ft. for twenty years as follows :—Oxide of zinc, 87·82 ; red-lead, 93·06 ; white-lead, 106·13 to 123·82 ; and oxide of iron, 132·20. These figures were based on prices when white-lead was cheaper and zinc oxide dearer than it is now and are given in shillings.

Zinc Sulphide or Lithopone.

I come now to a second zinc product, which, in many cases, is of equal importance. It is sold under various names, but is best known in the trade as zinc sulphide or lithopone. The original name was Charlton white, and it was invented by Mr. J. B. Orr, who took out a patent in 1874. This was the first white of its kind made in this country, but it is stated—I do not know on what authority—that it was made in Belgium before that date. The pigment is distinguished for three remarkable properties. In addition to being non-poisonous it has magnificent body and splendid spreading power. Most varieties will not stand exposure outside, the pigment possessing the peculiar property of changing colour ; but in recent years varieties of lithopone have been placed on the market which have been shown to be really permanent and to retain their colour. In cases of doubt I should recommend the addition of a little varnish, which would certainly assist in the durability. I am well aware that many painters object to adding varnish to their lead paint ; but, then, lead is an entirely different product, and lead, when mixed with linseed oil, forms a lead soap, while a zinc oxide or lithopone is nothing of the kind.

It may be useful to make reference here to the composition of lithopone, because it is frequently advanced as an unanswerable argument against it. Speaking approximately, it consists of 70 per cent. of sulphate of barium and 30 per cent. of sulphide of zinc. Now, chemically, ordinary barytes is sulphate of barium, and this product, when taken from the earth in the shape of heavy spar, such as is formed in Derbyshire and many other places, has little or no body. But when made chemically it has an entirely different physical structure ; indeed, natural and artificial or manufactured sulphate of barium are as different as chalk to cheese. By the courtesy of Messrs. Charles Griffin & Co., Ltd., the well-known publishers, I have a sheet giving reproductions of photographs of different pigments highly magnified. This sheet forms part of their new book by Heaton and Hurst. A comparison between the native barytes and blanc fixe, or artificial sulphate of barium, is very marked, one having a very distinct crystalline structure, while the other, although chemically identical, has a dense body which renders it very acceptable as a paint material. In passing, it should be said that sulphate of barium is wholly unaffected by acids or alkalis.

This class of pigment or zinc oxide can be used with great advantage on inside work. Lithopone is considerably cheaper than white-lead, and, as I have already mentioned, possesses superior body and spreading capacity. Why it is not invariably used in place of white-lead, at least for interior work, is more than I can understand, unless it be the prejudice in favour of white-lead to which I have already referred.

In any case, I give it as my deliberate opinion, in the presence of eminent and experienced architects and decorators, that to use white-lead paint for interior work is wasteful, unscientific, and altogether unreasonable, and that, however opinion may differ as to the durability of zinc compounds when exposed to the weather, there can be no question whatever as to their utility and economy for interior work, always bearing in mind at the same time the fact that they are non-poisonous.

"Undercoats."

Before leaving this part of the subject I wish to refer to another matter which arises out of the remarks I have made. As everyone present is aware, the usual custom in painting woodwork is to give first a priming coat of white-lead mixed with a little red-lead, with the object of hardening the film. I might mention, by-the-by, that I believe the red-lead to be wholly unnecessary, and think I am right in saying that in most countries it is not used at all ; certainly it is not in the United States, where the conditions of exposure are much more severe than they are at home. The second, third, and final coat, if there be a fourth coat, are usually pure white-lead reduced with the paste drier I have mentioned ; the only difference between these various coats is that one is made a little "sharper," as the painter would say, than the other—that is to say, a little more or less oil is used in the alternate coats in order to give each a grip on the other. This is all perfectly proper, although I am afraid sometimes even this small item is neglected. The question I wish to put is : "Why the undercoats, which are not exposed to the weather at all, should be composed of the same pigments as the outside coat." It seems to me to be unreasonable and certainly wasteful and unnecessary. We all realise that whatever the different coats are composed of they must not have any deleterious effect one on the other, and, if this condition is fulfilled, it seems to me that it does not much matter what pigment is used underneath so long as it has the proper body and spreading capacity. It is for this reason that what are called "undercoats" are coming so rapidly into favour. These are mostly composed of lithopone, and sometimes mixed with a little zinc oxide to give them strength, so to speak. They are much cheaper than the white-lead, and, as far as I have been able to ascertain, give equal results. The final coat is the one to which attention must be given for durability. To indicate that the undercoats are not really affected by the weather, let us take an ordinary case of painted work which is to have a varnished finish. A painter, in mixing, would put on his last coat under the varnish flat—that is to say, a little or no oil in it, but to unite the particles, would add a little gold-size. Now, if a flat coat were left exposed without the varnish it would probably not last six months but when the varnish is applied to it it does last a considerable time, showing that the varnish is the protecting agency, and not the undercoat at all. The theory is to use a dense body underneath to hide the knots of wood, and so forth, produce a perfectly flat and level surface, and then a finishing coat of oxide of zinc or varnish.

Varnishing Paint Work.

This brings me to a suggestion which I have long had in mind, viz., the extension of the system which I believe is practised in many parts of Scotland, to varnish all work even ordinary woodwork. I have already endeavoured to show the economy of using a good paint, and it is almost unnecessary to

* The second half of a paper read before the Edinburgh Architectural Association by Mr. Arthur Seymour Jennings, F.I.B.D. The first part appeared in our last issue, p. 353.

urge it again; but I should like to point out that the cost of labour may be taken at twice that of the material. If, therefore, one finished wood or other work with a good paint and gave it one or two coats of really good varnish on the top of it, it would last as long as it otherwise would, and, may be, longer; and if the cost is calculated it will be found that this will be real economy.

Pigments in Manufacture of Paint.

Before leaving the subject of paints I think I ought to mention another important matter in connection with them which appears to merit the attention of architects and decorators. I refer to the admixture of pigments in the manufacture of paint. Modern investigation has shown very clearly that since no one pigment can be considered as being perfect in all respects a mixture of pigments produces the best results; in other words, the defects of one pigment is made up by the strength of another. Thus a mixture of two-thirds of white-lead and one-third of zinc oxide ground together give an exceptionally durable paint, especially when exposed to the trying conditions of alternate wet and dry—say, for instance, in boat-painting. But everything will depend upon the exact position in which the paint is to be used. A good paint for one position may be a very bad one for another. As a matter of fact, a paint ought to be designed for the special purpose for which it is to be used, and the sooner the fact is recognised the better it will be for all concerned.

The Use of Mixed Paints.

One other point. Following out this idea, I would advocate the use of the best mixed paints, or perhaps I should say those special paints which are composed of several pigments carefully mixed and properly blended. I am well aware that in giving this opinion I risk the most severe criticism, not to say scorn, of some of those who listen to my remarks, but, if I may be pardoned for saying so, I know at least a little of what I speak. No one has a greater respect than I for decorators. Having been educated as an architect, I spent some years in decorative work before I entered trade journalism. And, in face of this experience, I say that the existing custom of mixing paint, usually a single pigment such as white-lead, by means of a paddle is absolutely primitive, unscientific, and out of date.

Other Painters' Materials.

Time will only permit me to make a brief reference to the other painters' materials I have mentioned. Fast reds are now made which stand quite as well as vermilion; they are comparatively cheap and possess splendid body. Some varieties, however, possess the serious defect of "bleeding," *i.e.*, when at any time it may be desired to change the colour, and a coat of oil-paint is given on top of the red, this works through in small drops like blood. The remedy is to apply two coats of liquid shellac or of the special materials made for the purpose called "obliterators." To test a red before using to ascertain whether it will bleed shake up a little in a bottle of oil. If the oil becomes tinted the red will bleed; in other words, it is dissolved in the oil. In painting over red work it is always desirable to ascertain whether or not a red will bleed. Mix a little zinc oxide or white-lead with sweet or salad oil. Put this on some hidden portion of the work. If after twenty-four hours the paste remains white—of course it will not dry—it may safely be assumed that the red will not bleed. It should be quite understood that there is now no difficulty in getting reds which are quite free from this defect. As to permanent greens, all I need say is that Brunswick greens, which are notorious for fading, are now rapidly being replaced by greens made in various pleasing tints and shades, and that these, if not actually permanent, at least last several years without changing colour. Emerald green, of course, although a beautiful colour, has practically died out owing to its poisonous character, being nearly half arsenic.

The old-fashioned paint removers or solvents, consisting of caustic alkali, are rapidly giving way to a class of paint softeners made from acetone, alcohol, and other substances. The advantage is that the work requires no treatment after the paint has been scraped off, as it does in the case of caustic soda and lime being used. The new paint removers do not injure the hands of the operatives. To prevent too rapid evaporation and hold the liquid on the paint wax is sometimes added.

With regard to aluminium paints I need only remark that they are now very extensively used on ornamental ironwork, particularly at the seaside. The best qualities last a long time and give the ironwork a very smart appearance. The work should be given a coat of white, and then one coat of aluminium paint will usually be found sufficient, as it possesses excellent body.

Water-Paints.

As to water-paints and their use, there would be amply sufficient in the subject to take up a whole evening. Most water-paints are made on a base of lithopone, to which I have already referred at some length. In addition to their uses for wall decoration, the many beautiful colours in which they are produced give ample facilities for producing an artistic effect, especially when there are many pictures to be hung and a plain background is desirable. They are often used as undercoats for oil-paint, and give excellent and most economical results, as I can testify from my own knowledge; in fact, for cottage property I should not hesitate to use them and a zinc oxide, especially on interior work. One great advantage they possess is that they absolutely prevent blistering, and I have cured the most obstinate cases of blistering by the simple experiment of taking off the oil-paint to the wood, giving two coats of good washable water-paint, and a finishing coat of white-lead or zinc oxide.

The following may be a useful hint to some of the gentlemen present. In applying water-paint or distemper to such plasters as Sirapite, Adamant, etc., a good result can only be obtained in one way, and that is to give a coat of sharp colour—oil-paint mixed principally with turpentine—to the plaster the very minute it is hard enough to receive it—that is, to resist the brush. The next week, or even the next day, will not do. The brush must follow the trowel, and if this is done the sharp colour forms part of the plaster, and a fine surface is presented upon which to distemper."

CANADIAN CLAY PRODUCTS.

ACCORDING to the annual report of Mr. J. McLeish, the Chief of the Dominion Division of Mineral Resources and Statistics, the clay products of Canada consist principally of common and pressed bricks, ornamental bricks, paving bricks, firebricks, porous fire-resisting bricks and blocks, sewer and drain pipes, sanitary ware, and pottery, the two last being manufactured chiefly from imported clays.

During the three years ending with 1911 the output of clay products has been almost doubled in value. For the year 1911 some 420 firms were engaged in the industry, the number of men employed being 9,131 and the total wages paid £705,000.

Ontario is the principal seat of the industry, that province having been responsible for 47 per cent. of the total value of the output, the other provinces concerned being Quebec with 16 per cent., Alberta with 12½ per cent., Manitoba with 10 per cent., and British Columbia with 8 per cent.

Of the total for 1911, building and paving bricks and fire-resisting materials represented nearly 84 per cent. of the total value of £1,671,986. The imports for the same year amounted to £1,031,308.

It appears that while the imports of building bricks are increasing rapidly, they were small in 1911 as compared with the home production. On the other hand, the imports of paving brick were more than double, and those of firebrick nearly ten times the Canadian production. The imports of sewer and drain pipes was more than doubled in the same year, when they represented about one-third of the home production.

CLEANING PAINTED WOODWORK.

A composition used in America for renovating painted surfaces is prepared as follows:—Four pounds of sodium carbonate, one pound of potassium carbonate, and one quarter of an ounce of potassium bichromate are dissolved in five gallons of boiling water, three gallons of water being added afterwards, the composition finally acquiring the consistency of jelly. The mixture will keep indefinitely, and its cost is purely nominal. It is applied with a brush, and the painted surface should then be well sponged. If the first application does not produce the desired result, the process should be repeated.

THE LUMSDEN CASE.

IT is stated that Mr. J. W. Tranter, of Bath, has received the following reply to a letter to Mr. Lloyd George with reference to the Lumsden case:—

"I am desired by the Chancellor of the Exchequer to say that there is no foundation for the statement that the effect of the procedure of the Inland Revenue Department, as endorsed by the judgment of the High Court in the case of the Commissioners of Inland Revenue *v.* Lumsden, is to charge a duty of 20 per cent. on all builders' profits. On the contrary, there have been, since the Act came into force, very many transactions by builders who have presumably realised a profit, but in very few cases has any charge of increment duty been raised. The practice of the Department in arriving at the site value on the occasion of a sale of a composite property by a builder is to deduct the whole of the value attributable to the operations of the builder. This will, in normal cases, include the whole of the profit of the builder who, presumably, builds houses, not out of charity, but because he expects to create a value which, when realised, will afford him a profit over and above the cost of production.

I am to point out that the circumstances of Mr. Lumsden's case were exceptional. He realised a price considerably in excess of the combined market value of the land and building. That market value included the builder's profit which he had created by his experience and skill, and in estimating the increment value a full and even generous allowance was made for the value attributable to the building, including the builder's profit, which accordingly was entirely eliminated from the charge of duty. The increment of £125, on which duty was charged, represented the excess of the sum obtained for the composite property over and above its market value, including builder's profits—an excess of price over value which the owner could not reasonably have expected to obtain, and which was a fortuitous windfall coming to Mr. Lumsden, not through his skill as a builder, but as a chance gain incident to the monopoly of land ownership. As such it was as fit a subject for taxation in his hands as it would be in the hands of any other owner, and the charge affords no ground for the belief that a builder's normal profits are endangered."

GENERAL BUILDING NEWS.

ELEMENTARY SCHOOL, TODMORDEN.

Messrs. Sutcliffe & Sutcliffe are the architects for this new school which has been erected at Castle Hill. The total cost of the work was £1,150.

NEW CINEMA, CATFORD.

A new picture palace is to be erected in Catford on a site at the corner of Bromley and Sangley roads. The architect is Mr. E. A. Stone, F.S.I., and the new building will provide accommodation for 2,000 people. Mr. J. Watt, of Catford, is the builder.

A NOTTINGHAM BOATHOUSE.

A new boathouse is to be erected for the Nottingham Britannia Boat Club. The boat-shed on the ground floor will be 63 ft. by 32 ft., and above is a dressing-room 50 ft. by 32 ft., and other rooms. The architect is Mr. W. R. Gleave.

DALKEITH'S NEW HOSPITAL.

A new infectious diseases hospital has been erected in Dalkeith at a cost of £5,000. The plans were prepared by Mr. A. Murray Hardie, Lic.R.I.B.A., of Edinburgh, and the building consists of five blocks.

PICTURE HOUSE, WESTON-SUPER-MARE.

Mr. W. H. Watkins, F.R.I.B.A., is the architect for the new picture theatre which has been erected in Regent-street. The size of the hall is 70 ft. by 39 ft.; accommodation is provided on the ground floor for 500 people, and in the balcony for 250. The contract was carried out by Messrs. R. Wilkins & Sons, of Bristol.

TRADE NEWS.

Under the direction of Messrs. Hicks & Charlewood, architects, Newcastle-on-Tyne, the "Boyle" system of ventilation (natural), embracing "Boyle's" latest patent "air-pump" ventilators and air-inlets, have been applied to Gosforth Parish Church, Gosforth, Newcastle-on-Tyne.

LEGAL COLUMN.

The Arbitration Clause in Engineering Contracts.

The decision of the House of Lords in the case, Bristol Corporation *v.* John Aird & Co., may be shortly noted as illustrating one of the circumstances which will suffice to induce the Courts to exercise a judicial discretion and refuse to stay an action, in spite of the existence in the contract of an arbitration clause. The matters in dispute between the contractors and the Corporation involve a sum of some £171,000, and the House of Lords, affirming all the lower tribunals, declined to stay the action on the ground that, in two of the most important questions involved, the engineer would be a necessary witness, and should be subject to cross-examination, a position entirely inconsistent with the judicial functions imposed upon him under the arbitration clause. The House was urged to limit the action to these two matters, allowing the rest to be referred to arbitration; but, as all the matters in dispute were subject to the arbitration clause, Lord Atkinson intimated that he knew of no authority justifying such a course being taken; moreover, as this suggestion had not been made in the proceedings in the Courts below, it was possible that it might prove that the arbitrator was in a similar position as regards the other heads of the claim.

In a recent article on the "Arbitration Clause" we ventured to make some suggestions with a view to obviating litigation. In the present case the House of Lords has had to be consulted on a preliminary point, and now the parties are in the same position as if no arbitration clause had been inserted in the contract.

Rating Water Gathering Grounds and Uninhabited Houses.

The case of Liverpool Corporation *v.* Chorley Assessment Committee (noted the *Builder*, January 5, 1912) has been carried to the House of Lords, where the judgment of the Court of Appeal has been affirmed. The Corporation, as the water authority, in order to keep the water supply free from pollution, had purchased a large tract of moorland some 1,165 acres in extent. On the greater part of this area farms had been closed by the Corporation and rights of pasturage and turbary abolished, and the sporting rights had been let and trees had been planted to improve the shooting; but the main object was to preserve the land as a gathering ground for water. The point to be decided was whether the Corporation were in rateable occupation of this tract of land? That is to say, besides being owners, were they in occupation? The House of Lords held that the Corporation were in beneficial occupation of the land in question. The destruction of the farmhouses, the planting of trees, and letting of the sporting rights—especially as the sporting tenant, under his lease, which gave him no interest in the land, had to perform certain duties for the Corporation, such as maintaining walls, burning ling, etc.—were all held evidence of beneficial occupation.

It was argued that rateable occupation meant occupation plus use, and even if that argument were accepted the House of Lords found that the Corporation were putting this land to use (1) for collecting a supply of pure water for their commercial undertaking; (2) as a game preserve.

As we pointed out in our former note, one of the features in the case of more general interest was the argument that the Corporation, as regards this land, were in the same position as an owner who leaves a house uninhabited and unfurnished, and is then not rated in respect of it. It will be seen that on the above findings the two cases are not comparable, as the Corporation were found to be exercising acts of ownership and actually deriving benefit from the property; but, as in the Court of Appeal Lord Justice Vaughan Williams stated he found it difficult to assign any reason for the owners of uninhabitated houses being so exempted, it is interesting to note the view taken upon this point in the House of Lords.

Lord Atkinson, who delivered the judgment of the House, said the word "land" would include the site and the building materials placed upon it, whether these materials were merely heaped together upon it or formed into a house; but the rating statutes mentioned a "house" as a separate kind of property, and it was only rateable when it was used as a house—that is, for the purposes of living in it, or sojourning in it, working in it, keeping animals in it, storing chattels in it, or using it for any purpose to which a house might reasonably be put. If it was left vacant and unfurnished it was no longer used as a house. This decision is of importance, because after the doubts expressed by Lord Justice Vaughan Williams it was possible that the rating authorities might have sought to rate vacant houses.

LAW REPORTS.

KING'S BENCH DIVISIONAL COURT.

(Before Justices CHANNELL, BRAY, and COLERIDGE.)

Railways and the General Building Line—Case under the London Building Act:

Metropolitan Railway Company *v.* London County Council.

THIS case was heard on March 14 upon the appeal of the railway company from a decision of a Metropolitan Stipendiary convicting them of erecting a structure beyond the general line of buildings on the north side of Euston-road between Ossulston-street and Churchway without the consent of the London County Council.

The facts came before the Court in the form of a special case, from which it appeared that by sect. 4 of the Metropolitan Railway (Additional Powers) Act, 1866, the company were empowered to acquire and use certain described lands as they might require them for the purposes of their Acts, and these lands included Nos. 110 and 112, Euston-road, and in July, 1867, the company purchased the freehold of these premises, subject to leases expiring in 1882. In front of the premises there were forecourts, upon which nothing was placed until 1882, when a ventilating-shaft was opened up from the railway through the forecourt, and the opening from the ground was enclosed to the height of about 6 ft.

By sect. 9 of the Metropolitan Railway Act, 1898, the company were empowered to enter upon, take, and use the two premises, and to make and maintain thereon openings and such other works as they might deem necessary or expedient for the purposes of ventilating their railway and otherwise for the improvement of certain of their stations. By sect. 15 of the same Act it was provided that, notwithstanding anything contained in that Act or shown on the deposited plans, it should not be lawful for the company, without the respondents' consent, to erect or maintain any building beyond the general line of building in any street in the county of London other than works for the purpose of ventilation, which should be made subject to the provisions of that Act. By sect. 25 and the following sections the company were authorised to work by electrical power the traffic on their own and certain other railways.

No alteration was made to the ventilator under the ventilating powers of the last-mentioned Act or otherwise, and it remained as originally constructed until shortly before the erection of the structure hereinafter referred to, when the ventilator was done away with, the ground being filled in and the walls or shafting removed.

In July, 1909, the company erected on the forecourt of Nos. 110 and 112 a structure 20 ft. in length and 8 ft. in width, consisting of a 9-in. brick wall to a height of 4 ft., supporting a wooden structure glazed with glass and with a roof of galvanised-iron, the total height to the ridge of the roof being 11 ft. 4 in. This structure was erected and used by the company for an accumulator-shed, in which were placed accumulators used in connection with the electrical signalling on their railway. In 1904 the company erected on the site of the houses, Nos. 110 and 112, a transformer station for reducing an alternating current of high voltage to a direct current of considerably lower voltage. In 1908 the company, finding that the signalling on their railway was not sufficiently good, introduced automatic signalling. In order to do this it was necessary to have a special current. This was produced inside the sub-station by two motor generators, but when the current was shut off for three or four hours a day it was necessary to have such accumulators to maintain the working of the signals. The accumulators were a necessary part of the apparatus of the automatic signalling system in use on the railway, and the magistrate found as a fact that the accumulators so used were used for railway purposes. Part of the structure was on the site of the ventilator.

By his certificate dated December 17, 1908, the Superintending Architect of Metropolitan Buildings certified that the main fronts of the buildings formed the general line of buildings on the north side of Euston-road between Ossulston-street and Churchway, in which part of Euston-road Nos. 110 and 112 were situate. That certificate was confirmed by the Tribunal of Appeal on February 2, 1912. The structure in question was erected beyond the general line of buildings so defined, and was erected without the London County Council's consent.

Sect. 22 of the London Building Act, 1894, provided that no building or structure should, without the consent in writing of the London County Council, be erected beyond the general line of buildings in any street or part of a street, place, or row of houses in which the same was situate, in case the distance of such line of buildings from the highway did not exceed 50 ft. Sect. 31 said that nothing in Part III. of the Act (which included sect. 22) should affect the exercise of any powers conferred upon any railway company by any special Act of Parliament for railway purposes.

It was contended, on behalf of the company, that the structure in question had been erected by them in the exercise of their powers under the Metropolitan Railway Acts, and was therefore exempted by sect. 31 from the operation of the London Building Act, and that therefore the summons ought to be dismissed.

It was contended, on behalf of the respondents, however, that the company's Act contained no power, and certainly no express power, entitling the company to erect the structure beyond the general line of buildings; that sect. 15 of the Metropolitan Railway Act, 1898, negatived any such power; that, having regard to sect. 50 and other sections of the Metropolitan Railway (Additional Powers) Act, 1866, the structure could not have been erected under the powers of that Act; that, if any such power existed under the 1866 Act, it had been repealed by the 1898 Act, or, at any rate, had ceased to be exercisable; that the structure was not, in fact, erected in the exercise of any power contained in or for any of the purposes of the 1866 Act, or of the earlier Metropolitan Railway Acts therein referred to.

The magistrate was of opinion that the company were not protected by sect. 31 of the London Building Act, 1894, and he therefore convicted them, and imposed a penalty of 40s. and 2s. costs.

Mr. Macmorran, K.C., and Mr. Bethune appeared for the company, and Mr. Daldy for the respondents.

Mr. Macmorran argued that the mere change from steam traction to electric traction did not alter the condition of things, and, although the ventilator was turned into an accumulator shed, it was still a necessary thing for the working of the railway. Assuming that the shed was erected for the working of the railway, it was authorised by sect. 66 of the Railway Act, and was also within the protection afforded by sect. 31 of the London Building Act.

Mr. Daldy addressed the Court for the London County Council, and said the railway company had a right to erect the ventilator, but when they decided to do away with it and erect a building, it was necessary for them to show their power to do it. The ventilator was not a building in the strict sense of the word, while the shed was. He would contend that they could not say, "We are only improving our work by erecting this shed," especially having regard to the fact that the shed was beyond the recognised building line.

Mr. Justice Channell: Have they, or have they not, power to enlarge a station on this spot?

Mr. Daldy: If they have power, that power would come to them under their common law rights as a railway company. They have the land and have a power, certainly, to build on it to a particular extent.

The Court allowed the appeal with costs.

Mr. Justice Channell said the question really turned on the meaning of sect. 31 of the London Building Act. The effect of that Act was to take away from owners of land abutting on the highway what might be called a margin of their land when there was a building line. But there was an exemption, which said that nothing in the Act would affect the rights of a railway company to erect certain things for railway purposes, and the question for the Court to consider was whether, when they built the shed beyond the building line, the company were erecting something for the purposes of the railway. They could not have erected shops when their Act was passed in 1866, but they could have erected the very thing about which the Council now complained if the electric signalling had been in vogue in those days. He thought the railway could say: "We erected this because it was necessary for railway purposes, and because the power we had in 1866 has not been vetoed by any Act passed since that time. In addition, he thought the appellants were protected by sect. 31 of the London Building Act passed at a later date.

Justices Bray and Coleridge concurred.

COURT OF APPEAL.

(Before Lords Justices VAUGHAN WILLIAMS, FARWELL, and KENNEDY.)

Goodwin v. Damper:

Claim for Work Done.

THE Court recently heard the defendant's appeal from verdict and judgment of the Lord Chief Justice and a special jury.

The plaintiffs, Messrs. William & Charles Goodwin, are builders and contractors at Tunbridge Wells, and the defendant Mrs. Sarah Rachel Damper, a married lady, of The Grange, Frodcombe, Kent. The action in the Court below was for £454 2s. 9d., the balance of an account for work done.

Mr. Pollock, K.C., for the appellant, said the case was a little curious. The only issue was the question of a balance of a very old account. There were three contracts, under which the respondents were to do certain work at The Grange, and they were dated 1899, 1900, and 1903. The result of the work done was that there was a claim for £454 2s. 9d., and that work was completed in 1904. Most of the work was done under the ordinary specifications. Mr. Willard was the architect, and payment was to be made on his certificate. That gentleman died in 1910 or 1911, and this action was commenced in March, 1911. The defendant had complained that the work had not been properly done, and she put in a defence of the Statute of Limitations. In order to get over that difficulty the plaintiffs set up an agreement under which the defendant agreed that she would sell a portion of her property known as Spring Hill Farm, and then she would pay them the balance, and meantime she would pay what she could. The allegation by the plaintiffs was that a portion of the farm was sold in February, 1911, and, as she did not pay plaintiffs, they entered the action. It was obvious, said counsel, that the Statute of Limitations was a perfectly good answer to the claim. The issue to be tried was whether the verbal agreement was sufficient to override the Statute of Limitations and the contract in writing. He (Counsel) complained that the Lord Chief Justice did not put before the jury the important point he made that the verbal agreement could not, and was insufficient for the plaintiffs' purposes, because it was proved at the trial that the work was done under a written contract of November 10, 1903. The written agreement was inconsistent with the verbal agreement, and the verbal agreement could not possibly stand. The issue left to the jury could not stand in law against the written contract.

Mr. Hohler, K.C., for the respondents, said the Lord Chief Justice stated that the verdict of the jury was inevitable on the evidence, and in order to save further expense he suggested that some arrangement should be come to.

Lord Justice Vaughan Williams said in some respects that might be desirable, but, as the matter was before them, they must deal with it on the law. In his opinion, after the direction of the Lord Chief Justice the verdict could not stand, because the jury only found that there was a verbal agreement, but they did not find that it was subsequent to the written agreement. That was inconsistent with the verdict.

Mr. Hohler complained that the point raised by Mr. Pollock now was not made at the trial, but the Court replied that it was, but not sufficient prominence perhaps was given to it.

The Court failed in an attempt at a settlement, and in ordering a new trial Lord Justice Vaughan Williams regretted such waste of money. It was disastrous and shocking for people to ruin themselves in such a matter, he declared.

KING'S BENCH DIVISION.

Builder's Claim against Architect: £1,030 Damages.

BEFORE Mr. Justice Bailhache and a common jury, Mr. Leon Harris, builder, of Upton Park, E., recently brought an action against Mr. Jabez Evelyn Daw, architect and surveyor, of Oxford-street, formerly of High Holborn, and Mrs. Elizabeth Jane Daw, his wife, claiming damages in respect of the alleged failure to certify and finance the plaintiff in the building of a number of houses at Thames Ditton, Surrey.

Mr. W. S. Schwabe, for the plaintiff, said that by a deed dated August 19, 1910, between the plaintiff and Abraham Harris, his son, on one part, and the defendant, Elizabeth Jane Daw, on the other, the latter agreed to advance sums of money in accordance with a schedule in respect of building work done by the plaintiff on land in St. Leonard's-road, Thames Ditton. These sums were agreed to be made by the defendant. Elizabeth Jane Daw, to enable the plaintiff to build twelve houses in all, and they were payable on production of certificates given by the defendants' surveyor. Under the deed the lady appointed her husband, Mr. Jabez Evelyn Daw, to act as her surveyor, and he from time to time did certify for work done in the construction of the houses. On September 5, 1910, continued Counsel, Abraham Harris assigned his interest in the building agreement to the plaintiff. The time for completion of the houses was extended from time to time, and was finally extended till June 24, 1911. The plaintiff had meanwhile been proceeding with eight of the twelve houses, and, as far as he knew, had committed no breach of the agreement. The first four houses were completed about May, 1911, and in the same month plaintiff became entitled also to a certificate for work done on the fifth and sixth houses. The defendant Jabez Evelyn Daw, although he knew the plaintiff was entitled to a certificate, said Counsel, refused to issue it, and his wife refused to advance the money. The result was that the plaintiff had suffered loss of profit on the sale of each house. Counsel added that there was a proviso in the agreement limiting the advances to £300 a house.

Mr. Coutts-Trotter, for the defence, denied there had been any breach of agreement by the defendants. Extensions of time for the completion of the work had been granted, but this was without prejudice to the right of the female defendant to the due performance of the contract by the plaintiff. The plaintiff, in fact, failed to complete the houses to the satisfaction of the surveyor (Mr. Daw), he did not continue uninterruptedly with the building, and he did not complete within the time required by the agreement. Mr. Daw, as far as he was concerned, had never refused to inspect the houses, and had never declined to grant certificates to which the plaintiff was justly entitled. Harris had, in fact, been treated with the greatest indulgence throughout.

Evidence was called on behalf of both sides.

Mr. Fread, Surveyor to the Thames Ditton local authority, attending on subpœna, was called for the defence, and said the quality of material and workmanship in the houses was not up to the average.

Witness was asked as to the certificates of completion given by him, and explained that it applied principally to sanitary matters.

You would not, of course, insist upon decoration before granting your certificate?—No.

His Lordship: Would you insist upon doors?—Yes.

Why? They would still be sanitary?—They would not be weather-proof.

His Lordship (to Mr. Schwabe): What certificates do you say you were entitled to from the male defendant?

Counsel: We must leave out the seventh and eighth houses. I say we were entitled to a final certificate for the first four and for five and six. We have received payment for the first.

After legal argument his Lordship said there was no case as against Mrs. Daw, and dismissed her from the action, with costs.

Addressing the jury, the judge said that the first and main question they had to consider was whether the houses were completed sufficiently for tenants to take possession, and whether, therefore, Harris was entitled to the final certificates. If they answered this in the affirmative, they would have to decide whether the remaining defendant improperly withheld the certificates in order to prevent the plaintiff obtaining payment of monies which were justly and properly due to him.

The jury found the plaintiff was entitled to the certificates, and that they had been improperly withheld. They awarded the plaintiff £1,030 damages. Judgment was entered accordingly, with costs.

Mr. Coutts-Trotter asked for a stay of execution, costs to be paid upon a solicitor's undertaking.

Mr. Schwabe: I do not object to a stay if the money is paid into court.

His Lordship: Then it must be upon those terms.

Solicitors: For plaintiff, Mr. S. A. Bailey, Bush-lane, E.C.; for defendants, Messrs. Cree & Turner, Jermyn-street, S.W.

KING'S BENCH DIVISION.

(Before Mr. Justice HORRIDGE.)

Action by Builder:

Davey v. Young.

THIS case, heard last week, was an action in which Mr. Frank Davey, builder, of Southend, claimed from the defendant, Mr. Young, oyster merchant, of Leigh-on-Sea, £589 for work done in connection with the erection of a house at Grand-parade, Westcliffe, in September, 1911.

Mr. Powell, K.C., and Mr. Hind (instructed by Messrs. Liddle & Liddle, Southend) appeared for the plaintiff; Mr. Holman Gregory, K.C., and Mr. Jowitt (instructed by Messrs. Goldring, Harding, & Goldring, Cannon-street, E.C.) were for the defendant.

Mr. Powell opening the plaintiff's case, said it appeared the defendant got an architect named Coxon to prepare plans and specifications for a projected house, which was to cost anything between £1,300 and £1,600. Apparently, having got Mr. Coxon's specification, the defendant went through it and cut a good deal out. Then he approached the plaintiff and asked if he would estimate for the erection of the house upon the altered specification. The plaintiff went through the specification and remarked that the building would not be a house at all, but only a carcass. Defendant, in reply, said he was quite aware of it, and he and his wife knew a great deal about building. Plaintiff found that things had been taken out of the specification which were absolutely necessary, while others had been left which were not requisite. He went to Mr. Thompson, of Southend, by whom a specification was prepared practically on the lines of the altered one, and allowing for a house with foundations, walls, and timbering. This specification was shown to the defendant with an estimate amounting to £850. The latter was accepted, and it was agreed that any additions were to be paid for as extras. The work was proceeded with, and later the defendant requested a further estimate for internal works, and this, amounting to £467, was supplied and accepted. Defendant gave the plaintiff two bills of exchange for that amount.

While negotiations had been going on, continued Counsel, there appeared to have been a dispute between Mr. Young and Mr. Coxon. The latter, feeling that he had been thrown over, commenced a County Court action for commission against Mr. Young.

According to the Judge's note, the suggestion was that the house was going to cost £850. Mr. Coxon wanted fees on £1,400, but ultimately that action was settled.

From time to time, as the work on the house proceeded, it was found that extras were necessary, and in one case additional concrete, to the extent of £69, was put in. Mr. Grieve, of Leigh-on-Sea, was asked by Mr. Young to superintend the work on his behalf and subsequently certified the value of the work done as £827, from which sums paid would have to be deducted.

Mr. Holman Gregory, K.C., remarked that, according to the defendant, there had been about £700 worth of work done, and the plaintiff had received £740. He now, however, set up that he had received £447 for payment for work inside, which had not been completed. Defendant, on the other hand, said it had been paid on the general contract.

Evidence was called, and, after a consultation between the parties, Mr. Powell announced that terms of settlement had been arranged. These were handed to his Lordship, who said he would grant a judge's order for payment.

Mr. Holman Gregory: For £200 and costs within fourteen days.

LONDON COUNCILS.

Barnes.—The following plans have been passed:—Mr. A. E. Chasemore, alterations and additions to Fontenay, Gipsy-lane; Mr. E. J. Partridge, garage, Treen-avenue, Barnes; Mr. R. B. Rowell, block of twelve flats, High-street, Mortlake, and four houses, First and Second avenues.

Chiswick.—Plans have been passed for Messrs. Sich & Co., Ltd., for the erection of additions at the Lamb Brewery. Mr. B. T. Flexman has lodged plans for the erection of four houses in Hazeldene-road.

Finchley.—The Council have decided to withdraw their acceptance of the tender of the Praed-road Construction Company, for repairing Fortis Green-road, and in lieu thereof have accepted the tender of the Improved Wood Pavement Company, Ltd., at £1,604 for laying wood paving on 9-in. concrete. The following plans have been passed:—Co-Partnership Tenants, Ltd., two houses, Oakwood-road, block of estate offices and flats, junction of Bishops-avenue and Great North-road, and twenty-one houses, Denman-drive; Mr. F. C. Huggins, four houses, Woodlands-avenue; Mr. W. Seymour, additions to Dantzig cottages, Ballards-lane; Messrs. C. Watts & Co., six houses, Cyprus-avenue; Mr. W. Foster, six houses, Falkland-avenue.

Friern Barnet.—Sanction has been received from the Local Government Board to the borrowing of £442 for paving works, which are to be carried out by the Patent Victoria Stone Company, Ltd.

Hammersmith.—The tenders of Messrs. J. Mowlem & Co., Ltd., Grosvenor Wharf, Westminster, S.W., have been accepted at

£7,164 and £2,312 for repaving the margins of portions of the carriageways of Goldhawk-road and King-street, with creosoted deal blocks. In connection with this work the Council have also accepted the tender of the Associated Portland Cement Manufacturers (1900), Ltd., for the supply of about 600 tons of Hilton-Anderson cement at £1 10s. 6d. per ton less 2½ per cent. This method of procuring the cement required has been resorted to so as to ensure that the article is of proper quality and sufficient strength. The Borough Surveyor has been directed to prepare plans and estimates of the cost of making-up and paving a portion of Fitzneal-street. Plans by the surveyor have been approved for making-up and paving as new streets, Palgrave-road, and portions of Aycliffe-road, Hartswood-road, and Hamlett-gardens. Messrs. W. Moss & Sons have lodged plans with the London County Council for the erection of additions to Messrs. Waring & Gillow's premises in Banim-street.

Hemel Hempstead.—It has been decided to adopt the model by-laws recently issued by the Local Government Board with respect to new streets and buildings (subject to one or two slight amendments), in place of those now in force. The "loop road" plan is to be adopted in the laying-out of the site of the Council's proposed housing scheme, and the architect has been requested to submit a block plan, showing several designs of houses which could be erected by this arrangement. It is proposed at first to erect about twenty-five buildings.

Holborn.—The tenders of the French Asphalte Company, Ltd., and the Improved Wood Pavement Company, Ltd., have been accepted for repaving a portion of Princeton-street with asphalt, and for repaving Alfred-place with wood blocks, respectively. The Roadamant Company, Ltd., are to lay a surface covering of "Roadamant," 1½ in. thick upon the existing granite paving in Old North-street at 6s. 6d. per yard super., and to maintain same for a period of five years, free of cost.

Hornsey.—Plans have been passed for Messrs. Herbert & Co., of Muswell Hill, for the erection of seventeen houses in Cascade and Glen avenues. Plans have been lodged by the following:—Messrs. H. G. & S. Constanduros, Finsbury-square, E.C., alterations to the Alexandra Tavern, Fortis Green, Muswell Hill; Messrs. W. D. Taylor and G. H. Nichols, additions at the rear of Myddleton Laundry, The Campsbourne, Hornsey; Mr. Charles Tucker, motor garage, Creighton-avenue, Muswell Hill.

Kensington.—With reference to the letter sent to the London County Council a few months back, asking them, in view of the deaths which occurred at the fire at Messrs. Barker's premises, and the opinion expressed at the time, that more adequate protection should be provided at such premises, whether any of the duties imposed by the London Building Acts could not better be discharged by the Metropolitan Borough Councils, and suggesting, in this connection, that the task involved in the enforcement of the provisions of sect. 9 of the London Building Acts (Amendment) Act, 1905, was of too onerous a nature to be satisfactorily performed by any single authority. A reply has now been received from the County Council stating that the Building Acts Committee were not aware that there was any considerable dissatisfaction at the present central administration of the London Building Acts, but that, if the Council was of that opinion, and decided to call a Conference of the Metropolitan Borough Councils to consider the question, the Building Acts Committee would give very careful consideration to any conclusions arrived at by such Conference. Being of opinion that this matter is one which might very well be considered by the Metropolitan Boroughs Standing Joint Committee, with a view to eliciting the views of a Conference of Metropolitan Borough Councils on the subject, a communication is to be addressed to the Committee, forwarding for their consideration a copy of the correspondence that has passed between the Kensington Council and the London County Council on the matter. Application has been made to the London County Council by Messrs. John Barker & Co., Ltd., for permission to build over a portion of their forecourt on the north side of Ball-street.

Richmond.—The surface of the carriageways of portions of seven roads are to be tarred at a total cost of £409. The tender of Messrs. Mowlem & Co., Westminster, at £219, has been accepted for extending Lion Gate-gardens through "The Elms" to Ennerdale-road. The contract for this work was first let in May last to Messrs. Wimpey & Co. at £171, but the firm did not now see their way to let that tender stand, and owing to an advance in the price of materials asked £225 for carrying out the work. Messrs. Mowlem also tendered at the same time at £211; but offered to do the work at the price mentioned in their accepted tender.

Stepney.—Messrs. Humphreys, Ltd., have lodged plans with the London County Council for the erection of a store at the Chain and Anchor Wharf, Narrow-street, Limehouse.

Stoke Newington.—Plans for the erection of a church and institute in Green-lanes, and for a picture theatre in Albion-road lodged by Messrs. T. Dorey & Co., Ltd., and Andrews & Peascod, respectively, have been passed.

Tottenham.—The following plans have been passed:—Mr. W. G. Taylor, care of H. S. Couchman, 520, High-road, Tottenham, six houses, Junction-road; Mr. Geo. Rudd, additions to bakery, Bracmar-road; Mr. W. J. Burstow, 16, Gloucester-place, Brighton, three houses, Seymour-avenue.

Watford.—The Housing Sub-Committee have under consideration the extension of the housing scheme already adopted by the Council.

Willesden.—It has been decided, subject to certain terms, to proceed with the erection of a convenience in Willesden-lane. The tender of Messrs. Davey and Armitage has been accepted at £1,637 for the erection of an underground convenience at South Kilburn. The wood paving in Willesden-lane is to be renewed, and application made to the Local Government Board for sanction to borrow £5,000, the estimated cost of the work. The watercourse between Waxlow-road and the Canal is to be culverted. Plans have been lodged by Mr. Harold Shaw on behalf of the Highfield Laundry, for additions to the works in Barry-road, Stonebridge; also by Mr. Arthur Welford on behalf of Mr. H. R. Hunter, for the erection of thirty-three houses in Herbert-gardens, Harlesden.

OBITUARY.

Mr. J. Medland.

The death, on March 14, at the Charterhouse, London, is announced of Mr. John Medland, aged seventy-two years. Mr. Medland was elected in 1881 an Associate, and in 1892 a Fellow, of the Royal Institute of British Architects. He was a pupil of Sir G. Gilbert Scott, with whom he worked during many years. Mr. Medland made the designs for the altar and reredos (illustrated in the *Builder* of December 28, 1901) of the chapel in Queen-square, Bloomsbury, W.C., of St. Katharine's Convent of the Sisters of St. Margaret's, East Grinstead; the restoration and redecoration, with new roof, of St. Stephen's Church, Tredegar-road, Old Ford, E. (Nichols, architect, 1857); and All Saints' Church, Buxton-street, Spitalfields, E., together with the oak carving in the chancel (1898-1900); the reparation, with new vestry, redecoration of the sanctuary, carved oak screens in the choir, and marble screen in the chancel, marble font, and carved oak pulpit, etc.; St. Peter's Church, Bethnal Green (Vulliamy, architect, 1841); the altar-cloth, St. Paul's Cathedral; and the memorial, consisting of a richly decorated and enamelled brass tablet, having massive silver studs, surmounted with repoussé silver figures of angels carrying a gold chalice, all set in a moulded black marble frame, supported by carved Devonshire marble corbels, erected seven years ago in Buckerell Church, Honiton, to the memory of the late vicar.

Mr. H. Winstanley.

The death is announced of Mr. Herbert Winstanley, of No. 10, Basinghall-street, E.C., who was elected an Associate of the Royal Institute of British Architects in 1860. He was the architect of the buildings in Prince of Wales's-road and Kentish Town-road, St. Pancras, for the Governors of the North-Western Polytechnic Foundation, and, conjointly with Mr. G. H. Elphick, of Nos. 1, 2, and 3, Bird in Hand-court, Cheapside, E.C., for the City Parochial Charities Trust.

TRADE CATALOGUES.

We have received from Messrs. George Wright, Ltd., of 155, Queen Victoria-street, and Burton Weir, Rotherham, their latest catalogue of stoves, ventilators, and sanitary and other requisites for schools and hospitals. Architects will find the illustrated lists of Messrs. Wright's newest patterns of hospital ward stoves, with ascending or descending flues, of especial interest and utility. Full drawings for fixing ventilating ward stoves with descending flues are given on pages 10 and 11. The outside casing of stove, sides, and front is made of cast-iron with Berlin black finish, and the top and side panels are usually of St. Ann's marble. Warm-air ventilating stoves, suitable for schools and institutions, are manufactured by the firm in great variety, as well as ranges (portable and otherwise), radiators, and independent circulating boilers. Lavatory fittings and baths for school and hospital use, air-bricks, ventilating gratings, and wrought-iron sashes and casements will also be found in this comprehensive catalogue, which includes illustrations of the "Vorticone" ventilating system, for which Messrs. Wright are the agents, and of one of the many external emergency staircases which they have made and erected.

We have received from the Val de Travers Asphalte Paving Company, Ltd., of Hamilton House, Bishopsgate, London, E.C., a neatly produced booklet in stout cloth binding, entitled "Practical Notes and Illustrations of the Uses of Mastic Asphalte." The introduction lays stress on the fact that the Mastic asphalt supplied by the firm is composed of genuine natural rock asphalt, fluxed with highly refined Trinidad bitumen, to which is added clean, dry Bridport grit, in proportion to suit the purpose for which the asphalt is required. The manufacture of the raw material is conducted entirely by British labour at the company's works at Deptford, S.E. Drawings are given to illustrate the employment of asphalt for horizontal and vertical damp-courses, flat roofs of every form, and for stable floors. The photographs reproduced of the company's mines and of various important buildings where their product has been used, including the Guildhall, the Bank of England, Westminster Cathedral, and the Prudential Insurance buildings in Holborn, form a veritable picture gallery.

We have received from the Trussed Concrete Steel Company, Ltd., a copy of their newly published Hy-Rib list, explaining the nature and various uses to which this material is being applied in building and engineering practice. On previous occasions we have described and illustrated the Hy-Rib material, and therefore need only say that it is a form of steel sheathing stiffened by rigid high ribs, and is suitable for use in place of lathing and studs, or as reinforcement for concrete employed in the construction of walls, floors, roofs, culverts, conduits, tanks, and other structures. In addition to descriptive matter dealing with the uses of Hy-Rib and with buildings and other works wherein it has been employed the list contains a large amount of really practical information in the form of specifications, working drawings, and tables specially prepared for the assistance of designers. The catalogue is excellently produced and fully deserves a place in the architect's reference library.

The Sturtevant Engineering Company, Ltd., 147, Queen Victoria-street, London, S.W., send us a pamphlet, dealing with the "Triple Duct" timber dryer, for which the firm have just obtained patents. This contrivance has been designed to obviate the difficulties usually attendant on the drying of hardwood in consequence of the closeness of the grain. In the ordinary drying kilns the temperature and circulation of the air can be regulated, but not the humidity, and it is difficult to obtain different conditions of temperature and circulation in different compartments, with the result that hardwood and large baulks of timber receive practically the same treatment as small pieces of soft wood. By means of the Sturtevant "Triple Duct" dryer the humidity as well as the temperature and circulation of the air can be placed under complete control in each compartment. The system, as the name implies, utilises three main distributing ducts, the first supplying warm dry air, the second cold dry air, and the third moist air. Branch ducts in each compartment connect with the three main ducts, and the supply of air is regulated by dampers, controlled from outside the kiln. The apparatus here described is rendered certain in its operation by the patent guide charts supplied by the firm. These charts, which show the conditions of temperature and humidity requisite for the proper drying of ordinary kinds of timber of different qualities and thicknesses, are placed upon the drum of a recording hygrometer, and the kiln dampers are manipulated to make the pens on the recorder follow the lines on the guide chart. By these means good results should be assured from the start, and any neglect on the part of the kiln attendant is at once shown by the recording instruments. From the charts supplied special charts for special materials can be readily made up.

Messrs. William Moore & Co., of Lauderdale Buildings, Aldersgate-street, London, E.C., call our attention to their excellent dust sheets for covering-up purposes. Sizes up to 12 ft. by 12 ft. are kept in stock, and any other size can be made at a few hours' notice. The firm also supply roofing felt, tarpaulins, sash-lines, plasterers' and paperhangers' scrim, etc.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xx.; Auction Sales, xxvi. Certain conditions beyond those given in the following information are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements; and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that may occur.**

Competitions.

MARCH 31.—**Ipswich.**—LAYING-OUT SUBURB.—The Ipswich B.C. invite competitive designs for laying-out 26 acres of land as a working-class suburb on the lines of a modified garden city. See advertisement in issue of January 31 for further particulars. Plans and particulars in issue of February 28, p. 265.

APRIL 9.—**Abertillery.**—ELEMENTARY SCHOOL.—"No premium will be paid, but a qualified assessor will be appointed." Particulars from the Council Offices, Abertillery.

APRIL 16.—**Staines.**—COTTAGE HOSPITAL.—Particulars from Mr. H. Scott Freeman, Staines.

APRIL 18. — **Reading.** — SCHOOLS.—The Reading Education Committee invite designs for the Kendrick Boys' and Girls' School. Competition limited to architects resident or carrying on business within the borough. See advertisement in issue of January 24 for further particulars.

April 19.—**Motherwell.**—NEW HIGH SCHOOL.—The School Board of Dalziel invite designs for new high school. Conditions of competition can be obtained on or before February 15. Assessor, Dr. J. J. Burnet. See advertisement in issue of February 7 for further particulars. See also "Competition News" (p. 266) in issue of February 28.

APRIL 21.—**Northampton.**—COUNCIL SCHOOL.—Local architects only. Second premium, 20 guineas; third premium, 10 guineas. Particulars from the Education Offices, Northampton.

APRIL 29.—**Barnet.**—MUNICIPAL OFFICES.—The Barnet U.D.C. invite designs for new Municipal Offices. Premiums £25, £15, and £10. See advertisement in issue of January 31 for further particulars.

MAY 31.—**London.**—COTTAGES AND BUNGALOWS.—Three premiums of £50 each are offered. Particulars from the Secretary, Ideal Home Exhibition, 130, Fleet-street, E.C. Assessor, Mr. Leonard Stokes, F.R.I.B.A.

JUNE 7. — **Exeter.** — HOSTEL. — The Exeter City Council invite designs for the erection of a hostel for male students. Assessor, Mr. Edwin Cooper, F.R.I.B.A. See advertisement in issue of March 14 for further particulars.

JUNE 14. — **Devonport.**—MUNICIPAL BUILDINGS AND GUILDHALL.—The Devonport Corporation invite designs for Municipal buildings and Guildhall. Premiums of £350, £150, and £100 respectively. See advertisement in issue of February 21 for further particulars. Plan, etc., in issue of February 28, p. 265.

* JUNE 19.—**Newcastle-upon-Tyne.**—LAYING-OUT PORTION OF WALKER ESTATE.—The Housing Committee of the Newcastle-upon-Tyne Corporation invite competitive designs for laying-out a portion of their Walker Estate. Premiums as follows are offered: £50, £30, and £20. See advertisement in this issue for further particulars.

JULY 1. — **Sofia.** — DESIGNS FOR A ROYAL PALACE AND LAW COURTS.—**Particulars from the Commercial Intelligence Branch of the Board of Trade, Basinghall-street, E.C. See page 173, August 9, and page 350, September 27, 1912.**

* NO DATE. — **Forest Row.**—HOUSE.—Designs are invited in competition for a house at Forest Row, Sussex. Premiums:—First, £80 and fees for superintendence on R.I.B.A. scale; others to the value of £120. See advertisement in this issue for further particulars.

NO DATE. — **Grays.** — SUNDAY-SCHOOL. — The Building Committee of the Baptist Tabernacle, Grays, invite designs for new Sunday-school. See advertisement in issue of March 7 for further particulars.

Contracts.

BUILDING.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

MARCH 28. — **Carlisle.** — ADDITIONS.—For the alterations and additions to be made at St. Joseph's Home, Botcherby, Carlisle. Plans and specifications, on deposit of £1 1s., from Mr. H. Foxall, Lic.R.I.B.A., architect, 54, Lowther-street, Carlisle.

MARCH 29. — **Blaenavon.** — CHURCH, ETC.—For the erection of a church and schoolroom at Blaenavon, Mon. Plans and specifications seen, and quantities from Mr. J. Daniel, 25, Lower Waun-street, Blaenavon. Deposit of £2 2s.

MARCH 29.—**Derry.**—PREMISES.—For extension to premises at Rossville-street, Derry. Specification with Mr. J. P. M'Grath, M.R.I.A.I., architect, 6, Castle-street, Derry

MARCH 29.—**Fenton.**—STATION.—For the erection of a police-station at Fenton. Deposit of £1 1s. to the Borough Surveyor, Town Hall, Stoke-upon-Trent.

MARCH 31. — **Cardigan.** — ALTERATIONS.—For alterations and fixing a bath, etc., at the School House. Plan, specification, and particulars with Mr. Geo. Dickens-Lewis, M.S.A., County Architect, Aberystwyth.

MARCH 31. — **Consett.** — ALTERATIONS. — For alterations to property, Delves-lane, Consett. Plans, specifications, etc., at the office of Mr. F. A. Coyle, architect and surveyor, Front-street, Consett.

MARCH 31.—**Halifax.**—ADDITIONS, ETC.—Alterations and additions to Heath Grammar School, Halifax. Plans seen, and quantities from Messrs. Richard Horsfall & Son, architects and surveyors, Halifax.

MARCH 31. — **Newcastle-on-Tyne.** — PULLING DOWN.—For pulling down three houses in Morrison-street, Portland-road. Conditions at the City Engineer's Office, Town Hall, Newcastle-upon-Tyne.

MARCH 31.—**Portsmouth.**—CONVENIENCE.—For reconstruction of the public convenience, Albert-road, Southsea. Specification and drawings seen, and form of tender, at the Borough Engineer's Office, Town Hall.

APRIL 1.—**Abercarn.**—HOUSES.—For the erection of twenty-five or more houses at Abercarn for the Chapel Farm Building Club. Plans and specifications with Messrs. Wm. Harris & Son, architects and surveyors, Bank-chambers, Bargoed.

APRIL 1. — **Clovelly.** — WORKS.—For carrying out works to various properties at Bratton Clovelly. Plans and specifications with Mr. James Crocker, F.R.I.B.A., architect and surveyor, Stuckey's Bank-chambers, Exeter.

APRIL 1. — **Denholme.**—WORKS.—For building new brickworks at Denholme, near Bradford. Messrs. E. Taylor & Son, architects, 15, Church-street, Halifax.

APRIL 1. — **Rochestown.** — HOUSE.—For the building of a dwelling-house, and the roofing of out-offices with corrugated-iron. Plans and specifications with Mr. Patrick Lane, Ardmore, Rochestown.

APRIL 1.—**Staverton.**—HOSPITAL.—For erecting a hospital for infectious diseases at Staverton. Plans, specifications, and quantities at the office of Mr. J. B. Williams, architect, Moot Hall, Daventry.

APRIL 1.—**Strabane.**—PREMISES.—For the erection of business premises in Main-street, Strabane. Plans and specifications with Mr. William Stuart, C.E., Strabane

APRIL 2.—**Aberdeen.**—WORKS.—For addition to steading at Burnside; addition to dwelling-house at Bankhead; new steading at South Murcar. Plans and specifications seen at the farms. Messrs. Watt & Cumine, advocates, 8, Golden-square, Aberdeen.

APRIL 2.—**Dartford.**—EXTENSION.—The Metropolitan Asylums Board invite tenders for extention of male staff bathrooms at Long Reach Small-pox Hospital, Dartford, Kent. Drawing and specification by Mr. W. T. Hatch, M.Inst.C.E., M.I.Mech.E., Engineer-in-Chief. Drawing, specification, and form of tender inspected at the office of the Board, Embankment, E.C., on deposit of £1.

APRIL 2. — **Rushden.** — CONVENIENCES.—For erecting conveniences, bridges, etc., in the new recreation ground. Particulars from Mr. W. B. Madin, C.E., Surveyor, Council Buildings, Rushden. Deposit of 10s. 6d.

APRIL 2. — **Tredegar.**—CINEMA.—For the erection of a new cinema theatre, proposed to be erected in Tredegar for the Tredegar Cinema Company, Ltd. Quantities, on deposit of £1 1s., from Mr. A. F. Webb, M.S.A., architect and surveyor, Blackwood.

APRIL 3. — **Sowerby Bridge.** — PARTITION. — Erection of sliding partition, New-road Council School. Specification, etc., from Mr. F. J. Macdonald, Education Offices, Sowerby Bridge.

APRIL 4.—**Audenshaw.**—SCHOOL.—For erection of a new elementary school in Poplar-street, Hooley-hill, Audenshaw. Plans seen, and quantities, at the office of the County Architect, Mr. H. Littler, 16, Ribblesdale-place, Preston. Deposit of £2.

APRIL 4.—**Galway.**—LIBRARY.—For the erection and completion of recreation hall and college library, St. Mary's College, Galway. Drawings and specifications with Mr W. A. Scott, A.R.H.A., A.R.I.B.A., architect, 45, Mountjoy-square, Dublin.

APRIL 5. — **Felixstowe.** — STORES, ETC.—For building a brick accumulator house and stores at Electric Lighting Station, Highfield-road, Felixstowe. Specifications, quantities, and form of tender from Mr. Montague Humphrey, Clerk to the Council, Town Hall, Felixstowe. Deposit of £1 1s.

APRIL 5.—**Fowey.**—CLUB.—For the erection of Constitutional Club, Fowey. Plans, specifications, and conditions of contract with Mr. C. W. Parkes Lees, architect, Porthpean House, Lanteglos-by-Fowey.

* APRIL 5. — **Tring.** — POLICE-STATION.—The Hertfordshire C.C. invite tenders for the erection of a police-station. See advertisement in this issue for further particulars.

APRIL 6.—**Newmarket.**—HOUSE.—For building a parochial house at Newmarket, Co. Kilkenny. Plans and specifications seen at the Presbytery, Newmarket. Messrs. Byrne & Son, architects, 20, Suffolk-street, Dublin.

APRIL 7. — **Carlisle.** — ADDITIONS.—For alterations and additions to the drainage and sanitary plumbing at the Hospital. Plans and specifications from Mr. C. W. Hill, 19, Fisher-street, Carlisle. Deposit of 10s. 6d.

APRIL 7.—**Chinley.**—ALTERATIONS.—For alterations to the Chinley Council School. Drawings, specifications, agreement, etc., at the office of Mr. G. H. Widdows, F.R.I.B.A., Architect to the Committee, County Education Office, St. Mary's Gate, Derby. Quantities on deposit of £1 1s.

* APRIL 7. — **Norbiton.** — NEW STORES.—The Guardians of the Kingston Union invite tenders for erection of new stores at the Workhouse, Norbiton. See advertisement in this issue for further particulars.

APRIL 7. — **Oxford.**—SHEDS, ETC.—For erection of boxes and sheds, attendant's cabin, etc., of wood and galvanised-iron construction, also galvanised-iron fencing and screens, at the new bathing place for ladies at Tumbling Bay. Drawings seen, and specifications and information, at the City Engineer's Office, Town Hall, Oxford.

APRIL 8. — **Halesowen.**—SHED.—For the erection of a goods shed at Halesowen, Worcestershire, for Great Western Railway. Plans and specification seen, and forms of tender and quantities at the office of the Engineer at Wolverhampton Station.

APRIL 8. — **Newport, Mon.** — OFFICES. — The Great Western Railway invite tenders for the erection of offices at Newport (High-street) Station, Mon. Plans and specification seen, and forms of tender and quantities, at the office of the New Works Engineer at Paddington Station, London.

APRIL 8.—**Pembroke.**—BUILDINGS.—The Great Western Railway invite tenders for the erection of station buildings, etc., at Clarbeston Road, Pembrokeshire. Plans and specification seen, and forms of tender and quantities, at the office of the Engineer at Neath Station.

APRIL 8. — **Swansea.** — REPAIRS.—The Great Western Railway invite tenders for repairs to the timber staging at North Dock, Swansea. Plans and specification seen, and forms of tender and quantities, at the office of the Engineer at Neath Station.

APRIL 10. — **London.** — GYMNASIUM, ETC.—For erection of gymnasium and swimming-bath at the schools, Green-street, Upton Park, E. Plans, etc., by Mr. W. Watson, A.R.I.B.A., architect. Quantities and drawings, on deposit of £2 2s., from Messrs. Hood Brothers, quantity surveyors, 8, Union-court, Old Broad-street, E.C.

APRIL 11.—**Bradley.**—SCHOOL.—For erection of a new school. Plans seen, and specifications, with quantities, from the Education Architect, County Hall, Wakefield. Deposit of £1. Tenders to Mr. Francis Alvey Darwin, Clerk of the County Council, County Hall, Wakefield.

* APRIL 11. — **Kent.** — NEW CLOAKROOMS.—The Kent Education Committee invite tenders for erection of new cloakrooms, etc., at the Wilmington Council School. See advertisement in this issue for further particulars.

APRIL 12. — **Lurgan.** — DWELLINGS.—For the erection of fifty-four workmen's dwellings. Plans and specifications by architect, Mr. James Hunter, B.E. Plans and specifications seen, and specifications, on deposit of £1 1s., from Mr. F. W. Pollock, Clerk of Council, Town Hall, Lurgan.

* APRIL 14. — **Curragh.** — OFFICERS' MESS AND QUARTERS.—The Secretary of State for War invites tenders for the erection of officers' mess and quarters for the Royal Army Medical Corps. See advertisement in this issue for further particulars.

* APRIL 14.—**Eastry.**—WORKMEN'S DWELLINGS.—Tenders are invited for erection of two pairs of workmen's dwellings. See advertisement in this issue for further particulars.

* APRIL 14. — **West Ham.** — ALTERATION OF HANDICRAFT CENTRE.—The West Ham Education Committee invite tenders for alterations to the handicraft centre at Harold-road School. See advertisement in this issue for further particulars.

BUILDING—*continued.*

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

APRIL 16.—**Ponteland.**—SCHOOL.—For erecting a new Council school at Ponteland. Deposit of £2 2s. to Mr. C. Williams, Secretary to the Education Committee, the Moothall, Newcastle-on-Tyne.

APRIL 17.—**Barton-on-Humber.**—SCHOOL.—For erection of a new Council school at Barton-on-Humber. Quantities and form of tender from Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln. Deposit of £2 2s.

* APRIL 19. — **Canterbury.**—NEW BUILDINGS.—Tenders are invited for erection of new buildings in connection with the Simon Langton Schools at Canterbury. See advertisement in this issue for further particulars.

* APRIL 22.—**Carlisle.**—POST-OFFICE.—The Commissioners of H.M. Office of Works and Public Buildings invite tenders for erection of new post-office at Carlisle. See advertisement in this issue for further particulars.

* APRIL 30. — **Lambeth.** — BUILDER'S WORK.—The Lambeth Guardians invite tenders for builder's work in connection with installation of heating system at the Children's Infirmary. See advertisement in this issue for further particulars.

NO DATE.—**Belfast.**—VILLAS.—For building two semi-detached villas at Bloomfield. Plan and specification at the office of Messrs. J. Fraser & Son, civil engineers and architects, 117, Victoria-street, Belfast.

NO DATE.—**Earby.**—HALL.—For erection of proposed billiard hall, New-road, Earby. Mr. J. P. Earnshaw, architect and surveyor, 56, Railway-street, Nelson.

NO DATE. — **Ebbw Vale.**—ALTERATIONS. — For alterations to the Bridgend Hotel, Ebbw Vale. Plans and quantities from Messrs. Swalwell & Havard, architects and surveyors, 202, Dock-street, Newport.

NO DATE. — **Lichfield.** — HOME, ETC.—For the erection of a nurses' home and four pairs of attendants' houses at the Asylum. Drawings and specifications at the offices of Mr. W. James Nevett, the County Architect, County Buildings, Stafford. Quantities on deposit of £2 2s.

NO DATE.—**Neath.**—CHURCH, ETC.—For United Methodist church and schools to be erected at Neath. Architects, Messrs. John Wills & Sons, St. Peter's Churchyard, Derby. Deposit of £1 1s.

NO DATE. — **Southend.**—SCHOOL.—For erection of new Hamstel Council school. Architect, Mr. Laurence T. Weaser, 132, High-street, Southend-on-Sea. Deposit of £2 2s. for quantities.

NO DATE.—**Woodbridge.**—HOUSE.—For erection of a junior boarding-house at Seckford School, Woodbridge. Deposit of £2 2s. to Mr. John Shewell Corder, architect, Wimbourne House, Ipswich.

ENGINEERING, IRON, AND STEEL.

MARCH 31.—**London.**—TOWER.—For the supply and erection of a natural-draught cooling tower, etc., at Hornsey, N. Forms of tender, etc., on deposit of 10s. 6d., from the Borough Electrical Engineer, Electricity Works, Tottenham-lane, Hornsey.

APRIL 5.—**Teddington.**—FURNACES, ETC.—Erection of two destructor furnaces, boiler settings, flues, etc., together with two Lancashire boilers, 28 ft. by 7 ft. 6 in. General conditions, specifications, form of tender, and drawings at the office of Mr. Marshall Hainsworth, Surveyor, Public Offices, Teddington; also Mr. William Fairley, consulting engineer, Parliament-mansions, Victoria-street, Westminster. Deposit of £5.

APRIL 14. — **Daventry.**—PLANT.—For the erection of a water-softening plant (capacity 10,000 gallons per hour) for the Borough water supply, the plant to be erected at the storage reservoir on Borough-hill, Daventry; a water-level indicator, with all the necessary apparatus, poles, wires, etc., for indicating at the Pumping Station at Dodford the height of the water in the storage reservoir on Borough-hill. Particulars from the Borough Surveyor, the Moot Hall, Daventry.

APRIL 21.—**Bulford.**—BRIDGE.—For the reconstruction of Bulford Bridge, Bulford, Salisbury Plain. Plans, specification, and form of tender from the County Surveyor, County Offices, Trowbridge.

* APRIL 30. — **Lambeth.**—ENGINEER'S WORK.—The Lambeth Guardians invite tenders for engineer's work in connection with installation of heating system at the Children's Infirmary. See advertisement in this issue for further particulars.

FURNITURE, PAINTING, MATERIALS, etc.

APRIL 1.—**Salisbury.**—PAINTING.—For painting the buildings, railings, etc., in the Victoria Park. Specifications seen, and form of tender from Mr. W. J. Goodwin, A.M.Inst.C.E., City Engineer and Surveyor, Municipal Offices, Salisbury.

APRIL 2.—**Abertysswg.**—PAINTING.—For painting, colouring, etc., at the Abertysswg Workmen's Hall and Institute. Particulars from Mr. D. O. Williams, Secretary.

APRIL 2. — **Littlehampton.** — PAINTING.—For works of cleansing and painting at Warningcamp Pumping Station and at the Town Offices and Public Library, Littlehampton. Specification seen, and form of tender from the Surveyor, Mr. H. Howard, M.S.A.

* APRIL 14.—**West Ham.**—CLEANING, REPAIRING, AND PAINTING SCHOOLS.—The West Ham Education Committee invite tenders for cleaning, repairing, and painting various schools during the Whitsun vacation. See advertisement in this issue for further particulars.

APRIL 15. — **London.** — PAINTING, ETC.—The London C.C. invite tenders for the cleaning, repainting, etc., of Hammersmith Bridge. Specifications, quantities, form of tender, etc., on application to the Chief Engineer of the Council, Mr. G. W. Humphreys, County Hall, Spring-gardens, S.W. Deposit of £1.

* APRIL 17. — **Tooting.** — PAINTING, ETC.—The Wandsworth Guardians invite tenders for painting works, etc., at the Tooting Home, Churchlane. See advertisement in this issue for further particulars.

ROADS, SANITARY AND WATER WORKS.

MARCH 29.—**New Romney.**—GRANITE, ETC.—For the supply of 450 tons of granite or quartzite, 2,820 yds. of Kentish rag, 830 yds. of gravel, 1,685 tons of beach. Forms of tender, with conditions of contract, from Mr. William B. Smith, District Surveyor, New Romney.

MARCH 31. — **London.**—ROADS.—For executing necessary works of repair on part of Welham-road, Streatham. Specification and drawings seen, and forms of tender from the Borough Engineer, Mr. P. Dodd, M.Inst.C.E., New Streets Department, No. 56, East-hill, Wandsworth, S.W. on deposit of £5 5s.

MARCH 31. — **York.**—STREET.—For continuation of new street from Pavement to Piccadilly. Drawings seen, and specification and quantities, on deposit of £2 2s., from Mr. F. W. Spurr, City Engineer, Guildhall, York.

* APRIL 5.—**Grimsby.**—ROAD AND DRAINAGE WORKS.—Tenders are invited for road formation and drainage works on the estate of Mr. G. F. Leigh. See advertisement in this issue for further particulars.

APRIL 7.—**Dover.**—STREETS, ETC.—For the construction of a carriageway with footpaths on either side, a double line of tramways with overhead electrical equipment, sewers, water and gas mains, and other works. Forms of tender, specification, and quantities, on deposit of £5 5s., from the Borough Engineer, Mr. W. C. Hawke, A.M.Inst.C.E., Maison Dieu House, Biggin-street, Dover.

APRIL 7.—**Maerdy Ford.**—BRIDGE.—For bridging the River Amman at Maerdy Ford, near Pantyffynnon Junction, Great Western Railway. Two stone-arch bridges, each of two 40-ft. span, with stone or copper-slag pitched causeway. Plans and specifications, with conditions of contract, with Mr. D. Thomas, M.I.Mun.E., Ammanford Urban District Surveyor, 10, Quay-street, Ammanford.

APRIL 9.—**Harwich.**—PAVING.—For works of making-up, metalling, channelling, and paving, etc., streets. Plans, sections, and conditions of contract with Mr. F. Harold French, Borough Surveyor, 41, Church-street, Harwich, Essex. Deposit of £1 1s.

* APRIL 9.—**Royston.**—WORKS OF SEWERAGE AND SEWAGE DISPOSAL.—The Royston U.D.C. invite tenders for execution of works of sewerage and sewage disposal at Royston, Herts. See advertisement in this issue for further particulars.

APRIL 12.—**Aberdare.**—BRIDGES.—For erection of Robertstown and Cwmbach bridges. Plans, specifications, and conditions of contract at the Surveyor's Office, Town Hall, Aberdare.

APRIL 15.—**Banff.**—ROAD.—For the reconstruction of four miles or thereby of the main road from Aberchirder towards Banff. Mr. James Grant, County and District Clerk, Banff.

* APRIL 16. — **Beckenham.** — RESURFACING ROADS.—The Beckenham U.D.C. invite tenders for resurfacing certain roads. See advertisement in this issue for further particulars.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*DRAUGHTSMAN	Poole Borough Council	£1 7s. 6d. per week	April 7
*SURVEYOR OF SCHOOL BUILDINGS	Bedfordshire Education Com.	£200 per annum	April 10
*CLERK OF WORKS	Bolton Corporation	£3 3s.	April 10

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*FREEHOLD SITE, FLEET-STREET—At the Mart	Farebrother, Ellis, & Co.	April 3
*BUILDING MATERIALS—On the Premises	Veryard & Yates	April 10
*FREEHOLD PROPERTY—At the Mart	Debenham, Tewson, Richardson, & Co.	April 15
*FREEHOLD WHARF AND FACTORY PREMISES—At the Mart	May & Rowden	April 17

PATENTS.

APPLICATIONS PUBLISHED.*

3,765 of 1912.—Joseph Thomas Briscoe: Frames for the upper part of manholes and like surface pits.

3,831 of 1912.—William Edward Evans (Walter Loebel): Method of removing mists from work spaces.

3,971 of 1912.—John Walter Gibbs: Ventilators for rooms and other like places.

4,132 of 1912.—Georges Rigot: Waste-preventing cock for water.

4,196 of 1912.—Frederick William Adams: Casement fasteners and the like.

4,205 of 1912.—John William Phillips: Draught and weather excluder for casement windows and doors.

4,260 of 1912.—Jakob Schroiff: Method of constructing reinforced concrete.

4,295 of 1912.—Carl Derschow: Apparatus for separating fine material, such as sand and other impurities, from coarser material.

4,397 of 1912.—Georges Rigot: Waste-preventing cock for water.

4,476 of 1912.—Gareth Everard Lechmere Guppy: Road paving and the surface dressing of roads.

4,524 of 1912.—William Fernell: Alarm devices for indicating excess of pressure in domestic and other water circulating operation.

4,727 of 1912.—James Henry Green: Construction of internal feed-water heater and purifier, and discharge apparatus used therewith.

6,003 of 1912.—Augustus Burkill and Richard Parkinson: Filtration of sewage, trade effluents, and the like.

6,057 of 1912.—Herbert Charles Francis Cordey: Vehicles for street sweeping and refuse collecting.

8,975 of 1912.—Ernest Marsh Ginders: Erection of steel towers and like buildings.

9,121 of 1912.—Wilhelm Grundy Knowles: Imitation domestic fire.

9,223 of 1912.—Henry Forrington Wilson: Gas-stoves.

10,589 of 1912.—Thomas Benjamin Colman: Revolving doors having radial wings.

10,690 of 1912.—Alfred Ernest John Price: Brick or tile for securing soil, rain-water, and other pipes.

13,527 of 1912.—Firm Friedrich Haas, G.m.b.H.: Process and apparatus for the drying of grooved or gutter tiles or other tiles and similar objects or materials.

17,572 of 1912.—Benjamin Joseph Brownjohn and Thomas James Denny: Sliding and swinging sash-windows.

18,029 of 1912.—Henry William Baines: Window-sash fasteners.

20,438 of 1912.—Magdalena Spring Wenger and Willy zu Wahlen: Chimney-tops.

23,573 of 1912.—Balint Vistyak: Machine for brushing and polishing parquet flooring.

23,833 of 1912.—George Bailey: Brackets for supporting gutters and the like.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

24,041 of 1912.—William John Luxmore: Plastic compositions.

26,455 of 1912.—J. B. Menz & Co.: Builders' cranes.

26,465 of 1912.—Paymond Passanore Penfield: Brick lifting and handling apparatus.

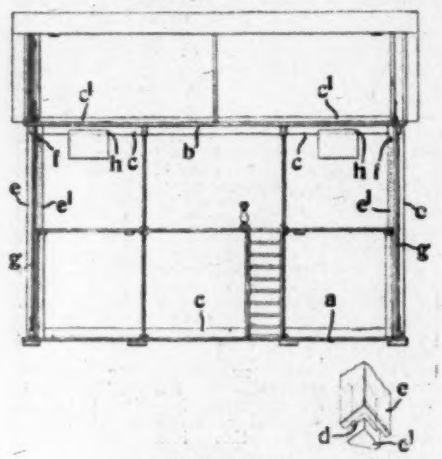
26,484 of 1912.—George M. Callender & Co., Ltd., and Edward John Farrell: Waterproof structures.

276 of 1913.—Fletcher Russell & Co., Ltd., and Thomas William Fletcher: Gas fires or stoves.

SELECTED PATENTS.

20,701 of 1911.—James Lee: Portable buildings.

This relates to portable structures for the construction of houses adapted to be dismounted for export. Upper and lower horizontal members *b*, *a*, are provided with fillets *c* on the lower and upper surfaces respectively, and are spaced apart by posts *e*, engaging by means of angular slots *d*, with the corners of the fillets. The posts *e* are retained on the

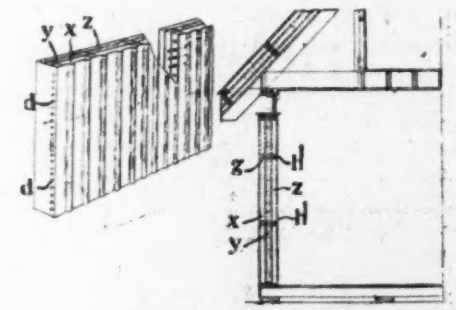


20,701 of 1911.

fillets *c* by means of inner strips e^1, secured to the post by screws *f*. The spaces between the posts are filled by panels *g*, resting at their lower edges on the fillets *c*, and retained in position at their upper edges by projections *h*. Each section of the roof is made in two parts hinged together and provided with depending pieces, engaging blocks or fillets c^1 on the top side of the upper member *b*. The gable-ends are filled in with panels secured in a similar manner to the panels *g*.

20,731 of 1911.—Florencio Escalada: Walls and roofs.

This relates to walls and roofs for workmen's huts and other portable structures for tropical climates, which are constructed with outer and inner air spaces *x*, *z*, separated by an intermediate nonconducting layer *y* of clay. The spaces *x*, *z*, are divided horizontally by means



20,731 of 1911.

of battens *g*. Air passing through holes *d*, which may be closed by a hit-and-miss shutter, circulates horizontally in the outer space *x*, while cool air drawn from below the flooring circulates vertically through the inner space *z*, the battens *g* being perforated at h^1 for this purpose. The space under the eaves is utilised for storage purposes.

TERMS OF SUBSCRIPTION.

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SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

March 6.— By GRIMLEY & SON.

Birmingham.—Upper Gough-st., Gough Arms p.h., 16 to 20, Marshall-st., f., y. and w.r. £132 16s.	£1,400
105, Bellbarn-rd., u.t. 32 yrs., g.r. £2 17s. 6d., w.r. £28 12s.	120
Erdington, Warwick.—17, Short Heath-rd., f., w.r. £23 8s.	330
Balsall Heath, Worcs.—187 and 189, Belgrave-rd., u.t. 39 yrs., g.r. £4 11s. 6d., w.r. £46 10s.	210

March 7.—By GEORGE BILLINGS & Co.

Walthamstow.—13, 17, and 19, Priory-av., u.t. 69 yrs., g.r. £12, w.r. £87 14s.	345
Manor Park.—36, Durham-rd., u.t. 63 yrs., g.r. £4 8s., y.r. £22	170
Leyton.—12, Albany-rd., f., e.r. £4)	330

By W. B. HALLETT.

Canonbury.—22, Alwyne-sq., u.t. 23 yrs., g.r. £10, y.r. £60	150

By MARK LIELL & SON.

Plaistow.—713 to 719 (odd), Barking-rd., f., w.r. £153	1,630
10, Tabernacle-av., f., w.r. £33 16s.	325
60, Central Park-rd., f., w.r. £26	285
East Ham.—52, Lawrence-rd., f., p.	225

March 10.—By ERNEST OWERS.

South Hampstead.—123, 125, and 127, Goldhurst-ter., u.t. 65 yrs., g.r. £24, y. and e.r. £160	1,265
Hampstead.—162, King Henry's-rd., u.t. 39 yrs., g.r. £10, e.r. £55	450

By WINTERTON & SONS.

Castle Gresley, Derby.—Ten cottages and 4 a. 2 r. 17 p., f.	1,215

March 11.—By MARKS & BARLEY.

Paddington.—Bishop's-rd., Prince of Wales p.h., lease for 25 yrs. at £2, with goodwill and possession, also 3, Bishop's-rd. (a.), u.t. 25 yrs., g.r. £15, y.r. £100	13,230
Bayswater.—Great Western-rd., Metropolitan p.h., f., y.r. £150	6,500
Hereford-rd., Princess Royal p.h., f., y.r. £150	5,575
Wanstead.—High-st., Cuckfield Hotel, f., y.r. £125	2,700

By ROGERS, CHAPMAN, & THOMAS.

South Kensington.—4, Manson-mews, u.t. 56 yrs., g.r., etc., £7, y.r. £50	500
Belgravia.—23, Westbourne-st. (s.), u.t. 8 yrs., g.r. nil, e.r. £60	100
St. John's Wood.—30 to 36 (even), Carlton-hill, f.g. rents £42, reversion in 24 yrs.	1,275
Forest Hill.—7, Westwood-park, f.g.r. £16 16s., reversion in 49 yrs.	270

By GLENDINING & Co.

Bermondsey.—1 to 18, Pleasant-row; 1 to 9, Virginia-row, u.t. 77 and 82 yrs., g.r. £10 5s., w.r. £421 4s.	350

By HUSSEY, WALCOTT, & Co.

Fulham.—Peterborough-rd., f.g. rents £37 16s., reversion in 98 yrs.	850
Clancarty-rd., f.g. rents £94 10s., reversion in 98 yrs.	2,190

By BROAD, WILTSHIRE, & PENNY.

Woodchurch, Kent.—Hornbrook Farm, 48 a. 1 r. 23 p., f.	800

By ERNEST S. BEARD & DANIELL.

Colchester.—43 to 73, 87 to 97 (odd), Harwich-rd., f., w.r. £286	3,245

By ELLIOTT & SONS.

Brighton.—24, Tidy-st., f., w.r. £28 12s.	275
34, Sdyney-st., f., w.r. £33 16s.	400
11, Kew-st., f., w.r. £20 16s.	145
6, St. George's-ter., f., y.r. £26	220
17, College-st., f., w.r. £28 12s.	240
1, Great College-st., f., e.r. £33 16s.	245
11, Sudeley-st., f., w.r. £28 12s.	280
12, Montague-st., f., w.r. £19 10s.	190
10, 12, and 14, Rugby-pl., f., w.r. £70 4s.	560
41, Holland-st., f., w.r. £18 4s.	135
38, Lincoln-st., f., w.r. £20 16s.	165
8, St. Leonards-rd., f., w.r. £26	230
33, Newmarket-rd., f., w.r. £20 16s.	135
32 and 33, Carlton-row, f., w.r. £26	130
Preston.—51, Stanford-av., f., y.r. £48	590
28, Lancaster-rd., f., y.r. £40	500
5, Balfour-rd., f., y.r. £35	465

March 12.—By BROAD, WILTSHIRE, & PENNY.

Gravesend, Kent.—Brunswick and Augustine-rds., f.g.r. £15, reversion in 30¾ yrs.	320
Limehouse.—Commercial-rd. East, f.g.r. £4, reversion in 24½ yrs.	460
Bow.—Devons-rd., f.g.r. £12 12s., reversion in 52½ yrs.	230
Homerton.—25, Churchill-rd., f., w.r. £32 10s.	315
Battersea.—10 and 14, Elcho-st., f., w.r. £65	370
16, 39, and 41, Verona-st., f., w.r. £75 8s.	515
Caledonian-rd.—265, Copenhagen-st., u.t. 29 yrs., g.r. £4, w.r. £33 16s.	100
Hornsea.—26, Montague-rd., u.t. 74 yrs., g.r. £6 6s., w.r. £35 2s.	110

By FOSTER & CRANFIELD.

Holborn.—19, Eagle-st., and 11, Dane-st., f., gross rental £132 2s.	800
Regent's Park.—Munster-sq., l.g. rents £165 2s., u.t. 10 yrs., g.r. £40 19s.	320
Hampstead-rd.—36, Robert-st., u.t. 8½ yrs., g.r. £8 8s., y.r. £52	130

By HAROLD GRIFFIN.

Battersea.—42, 44, and 46, Park-rd., and 1, Juer-st., u.t. 74 yrs., g.r. £25, w.r. £274 6s.	1,100
336, York-rd. (s.), u.t. 54 yrs., g.r. £10, y.r. £40	270
120, Usk-rd., u.t. 50 yrs., g.r. £4 10s., w.r. £31 4s.	160
15, St. John's Hill-gr., u.t. 38 yrs., g.r. £4 4s., w.r. £33 16s.	155
3, Louvaine-rd., u.t. 48 yrs., g.r. £7 7s., e.r. £38	200

By DOUGLAS YOUNG & Co.

Upper Norwood.—Beulah Hill, Beulah Spa Hotel, area 5 acres, f., y.r. £325	£6,000

By JAMES ELEY.

Sutterton Fen, Lincs.—Farm, 36 a. 3 r. 1 p., f.	1,075

By EDWARD COATES.

Fulham.—45, Coomer-rd., u.t. 52 yrs., g.r. £4, w.r. £33 16s.	175
65 to 73 (odd), Coomer-rd., u.t. 53 yrs., g.r. £15, w.r. £167 14s.	925
75 to 81 (odd), Coomer rd., u.t. 52 yrs., g.r. £10, w.r. £128 14s.	710
87 to 93 (odd), Coomer-rd., u.t. 52 yrs., g.r. £11, w.r. £133 18s.	700

By BEKEN & STOKES.

Walthamstow.—6, Woodbury-rd., f., p.	300

March 13.—By DRIVERS.

Holloway.—541, Caledonian-rd., u.t. 41 yrs., g.r. £10, e.r. £50	400

By NEWBON & SHEPHARDS.

Finsbury Park.—3, Queen's-rd., u.t. 46¼ yrs., g.r. £9, e.r. £60	305
Stoke Newington.—2, Defoe-rd., u.t. 51½ yrs., g.r. £5 10s., y.r. £28	165
City-rd.—71 and 75, Morland-st., u.t. 15 yrs., g.r. £16 10s., y.r. £78	170

By OGDEN, SONS, & OLLEY.

Wimbledon.—43, Worple-rd., f., y.r. £95	1,300
3, Berkeley-pl., u.t. 65¾ yrs., g.r. £10, e.r. £70	600

By STIMPSON & SONS.

Upper Park.—43 to 49 (odd), Redclyffe-rd., f., w.r. £89 14s.	600
Stratford.—51, Vicarage-la. (s.), u.t. 63 yrs., g.r. £8, e.r. £40	170
Kennington.—3, Faunce-st., u.t. 51 yrs., g.r. £6, w.r. £52	210
Walworth.—27 to 35 (odd), Olney-st., f., w.r. £175 18s.	1,375
Streatham.—59, Gleneldon-rd., u.t. 68 yrs., g.r. £10 10s., y.r. £45	280
Penge.—39 and 40, Mossles-rd., u.t. 92 yrs., g.r. £8, w.r. £66 6s.	400

By J. A. & W. THARP.

Limehouse.—137, Salmon-la. (s.), f., y.r. £52	640
Leyton.—120 and 122, Frith-rd., u.t. 68 yrs., g.r. £12, w.r. £45 10s.	150

By GRIMLEY & SON.

Cofton Hackett, Worcs.—Lowhill Farm, 60 a. 3 r. 26 p., f.	2,700
Hockley, Warwick.—39 and 41, New Spring-st., and six houses in rear, u.t. 57 yrs., g.r. £9 1s 8d., w.r. £105 19s.	620
Harborne, Staffs.—96 to 106 (even), Lordswood-rd., u.t. 92 yrs., g.r. £23 6s 2d., y.r. £180.	1,320

***Contractions used in these lists.*—F.g.r.** for freehold ground-rent; **l.g.r.** for leasehold ground-rent; **i.g.r.** for improved ground-rent; **g.r.** for ground-rent; **r.** for rent; **f.** for freehold; **c.** for copyhold; **l.** for leasehold; **p.** for possession; **e.r.** for estimated rental; **w.r.** for weekly rental; **q.r.** for quarterly rental; **y.r.** for yearly rental; **u.t.** for unexpired term; **p.a.** for per annum; **yrs.** for years; **la.** for lane; **st.** for street; **rd.** for road; **sq.** for square; **pl.** for place; **ter.** for terrace; **cres.** for crescent; **av.** for avenue; **gdns.** for gardens; **yd.** for yard; **gr.** for grove; **b.h.** for beerhouse; **p.h.** for public-house; **o.** for offices; **s.** for shops; **ct.** for court.

PRICES CURRENT OF MATERIALS.

***** Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.**

BRICKS, &c.

Per 1000 Alongside, in River.	£ s. d.
Best Stocks	1 16 0
Picked Stocks for Facings	2 10 0

Per 1000, Delivered at Railway Depôt.	£ s. d.		£ s. d.
Flettons	1 14 0	Best Blue Pressed Staffordshire	3 15 0
Best Fareham Red	3 12 0	Do. Bullnose	4 0 0
Best Red Pressed Ruabon Facing	5 0 0	Best Stourbridge Fire Bricks	4 0 0
Glazed Bricks—			
Best White, Ivory, and Salt Glzd. Str'tch'rs	12 7 6	Double Headers	14 17 6
		One Side and two Ends	18 17 6
Headers	11 17 6	Two Sides and one End	19 17 6
Quoins, Bullnose, and 4½ in. Flats	13 17 6	Splays & Squints	17 7 6
D'ble Stretchers	17 17 6		

Second Quality £1 10s. per 1000 less than best.

	s. d.	
Thames and Pit Sand	6 9	per yard, delivered
Thames Ballast	5 6	" "
Best Portland Cement	36 0	per ton, "
Best Ground Blue Lias Lime	19 0	" "

NOTE—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	13s. 6d. per yard delivered
Stourbridge Fireclay in sacks	27s. 0d. per ton at rly dpt

STONE.

Per Ft. Cube.	s. d.
BATH STONE—delivered on road waggons, Paddington Depôt	1 7½
Do. do. delivered on road waggons, Nine Elms Depôt	1 1½
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 4
White Basebed, delivered on road waggons Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 6

STONE (Continued).

Per Ft. Cube, delivered at Railway Depôt.

	s. d.		s. d.
Ancaster in blocks..	1 10	Closeburn Red Freestone	2 0
Beer in blocks	1 6	Red Mansfield Freestone	2 4
Greenshill in blocks	1 10	Talacre & Gwespyr Stone	2 4
Darley Dale in blocks	2 4		
Bed Corsehill in blocks	2 3		

YORK STONE—*Robin Hood Quality.*

	s. d.
Per Ft. Cube, Delivered at Railway Depôt.	
Scappled random blocks	2 10
Per Ft. Super., Delivered at Railway Depôt.	
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3
6 in. rubbed two sides ditto, ditto	2 6
3 in. sawn two sides slabs (random sizes)	0 11½
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7
1½ in. to 2 in. ditto, ditto	0 6

HARD YORK—

	s. d.
Per Ft. Cube, Delivered at Railway Depôt.	
Scappled random blocks	3 0
Per Ft. Super., Delivered at Railway Depôt.	
6 in. sawn two sides landing to sizes (under 40 ft. super.)	2 8
6 in. rubbed two sides ditto	3 0
3 in. sawn two sides slabs (random sizes)	1 2
2 in. self-faced random flags	0 5

SLATES.

Per 1000 of 1200 at Railway Depôt.

In. In.	£ s. d.	In. In.	£ s. d.
20×10 best blue Bangor	13 2 6	20×10best Eur'ka unfading green	15 17 6
20×12 ditto	13 17 6	20×12 ditto	13 7 6
20×10 1st quality ditto.....	13 0 0	18×10 ditto	13 5 0
20×12 ditto	13 15 0	16×8 ditto	10 5 0
16×8 ditto	7 5 0	20×10 permanent green	11 12 6
22×10 best blue Portmadoc.....	12 12 6	18×10 ditto	9 12 6
16×8 ditto	6 12 6	16×8 ditto	6 12 6

TILES.

At Railway Depôt.

	s. d.		s. d.
Best plain red roofing (per 1000)	42 0	Best "Hartshill" brand, plain sand-faced (per 1000) ...	45 0
Hip and Valley (per doz.).....	3 7	Do. pressed (per 1000)	42 6
Best Broseley (per 1000)	50 0	Do. Ornamental (per 1000)	47 6
Do. Ornamental (per 1000)	52 6	Hip (per doz.)...	4 0
Hip and Valley (per doz.)	4 0	Valley (per doz.)	3 6
Best Ruabon red, brown, or brindled (Edw'ds)(per 1000)	57 6	Staffords. (Hanley) Reds or Brindled (per 1000)	42 6
Do. Ornamental (per 1000)	60 0	Hand-made sand-faced (per 1000)	45 0
Hip (per doz.)...	4 0	Hip (per doz.)...	4 0
Valley (per doz.)	3 0	Valley (per doz.)	3 6

WOOD.

BUILDING WOOD.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.....	15 0 0 ...	16 10 0
Deals: best 3 in. by 9 in.....	15 0 0 ...	16 0 0
Battens: best 2½ in. by 7 in. and 8in., and 3 in. by 7 in. and 8 in.	12 10 0 ...	13 10 0
Battens: best 2½ by 6 and 3 by 6...	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less thn best.
Battens: seconds	0 10 0	" "
2 in. by 4 in. and 2 in. by 6 in....	11 10 0 ...	12 10 0
2 in. by 4½ in. and 2 in. by 5 in.	10 10 0 ...	11 10 0
Foreign Sawn Boards—		
1 in. and 1½ in. by 7 in.	0 10 0	more than battens.
½ in.....	1 0 0	"
Fir timber: best middling Dansig or Memel(average specification)	At per load of 50 ft. 5 0 0 ...	6 5 0
Seconds	4 10 0 ...	5 0 0
Small timber (8 in. to 10 in.) ...	3 17 6 ...	4 0 0
Small timber (6 in. to 8 in.).....	3 5 0 ...	3 10 0
Swedish balks	2 12 6 ...	3 0 0
Pitch-pine timber (30 ft. average)	6 0 0 ...	7 0 0
JOINERS' WOOD.	At per standard.	
White Sea: first yellow deals, 3 in. by 11 in.....	26 0 0 ...	27 0 0
3 in. by 9 in.	24 0 0 ...	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	18 10 0 ...	19 10 0
Second yellow deals, 3in. by 11in.	21 10 0 ...	22 10 0
" " 3 in. by 9 in.	20 0 0 ...	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	15 0 0 ...	16 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 0 0 ...	17 0 0
Battens, 2½ in. and 3 in. by 7 in.	14 0 0 ...	15 0 0
Petersburg: first yellow deals, 3 in. by 11 in.	23 0 0 ...	24 0 0
Do. 3 in. by 9 in.	20 0 0 ...	21 0 0
Battens	15 0 0 ...	16 0 0
Second yellow deals, 3 in. by 11 in	17 10 0 ...	18 10 0
Do. 3 in. by 9 in.	16 0 0 ...	17 0 0
Battens	12 10 0 ...	13 10 0
Third yellow deals, 3 in. by 11 in.	14 0 0 ...	15 0 0
Do. 3 in. by 9 in.	13 10 0 ...	14 10 0
Battens	11 10 0 ...	12 10 0
White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	16 10 0 ...	17 10 0
" " 3 in. by 9 in.	14 10 0 ...	15 10 0
Battens	13 0 0 ...	13 10 0
Second white deals, 3in. by 11in.	14 10 0 ...	15 10 0
" " 3 in. by 9 in.	13 0 0 ...	14 0 0
Battens	12 0 0 ...	12 10 0
Pitch-pine: deals	25 0 0 ...	26 10 0
Under 2 in. thick extra.....	0 10 0 ...	1 0 0
Columbian or Oregon Pine, best quality.....	23 10 0 ...	26 0 0
Yellow Pine—First, regular sizes	30 0 0	upwards.
Oddments	35 0 0	"
Seconds, regular sizes	36 0 0	"
Oddments	31 0 0	"
Kauri Pine—Planks per ft. cube,	0 5 6 ...	0 6 6

WOOD (Continued).

JOINERS' WOOD (Continued)—	£ s. d.	£ s. d.
Dansig and Stettin Oak Logs—		
Large, per ft. cube.....	0 3 0 ...	0 3 9
Small " "	0 2 6 ...	0 3 0
Wainscot Oak Logs, per ft. cube	0 7 6 ...	0 9 0
Dry Wainscot Oak, per ft. super. as inch.....	0 0 10 ...	0 1 2
½ in. do. do.	0 0 9 ...	0 1 0
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch..	0 0 10 ...	0 1 3
Selected, Figury, per ft. super. as inch	0 1 6 ...	0 2 6
Cuba Mahogany	0 1 4 ...	0 2 6 upwards.
Dry Walnut, American, per ft. super. as inch	0 0 10 ...	0 1 2
French, "Italian," Walnut	0 0 10 ...	0 1 4
Teak, per load (Rangoon or Moulmein).....	21 10 0 ...	26 0 0
Do., do. (Java)	19 0 0 ...	22 10 0
American Whitewood planks, per ft. cube	0 5 6 ...	0 6 6
Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 14 6 ...	0 18 0
in. by 7 in. yellow, planed and matched	0 14 9 ...	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 17 6 ...	1 3 0
1 in. by 7 in. white, planed and shot	0 14 0 ...	0 13 0
1 in. by 7 in. white, planed and matched.....	0 14 3 ...	0 16 6
1¼ in. by 7 in. white, planed and matched.....	0 16 6 ...	0 8 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 12 6 ...	0 15 0
1 in. by 7 in. " "	0 15 0 ...	0 18 6
¾ in. by 7 in. white " "	0 12 0 ...	0 14 0
1 in. by 7 in. " "	0 14 6 ...	0 16 6
6 in. at 6d. to 9d. per square less than 7 in.		

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 0 0 ...	10 0 0
Compound Girders, ordinary sections	11 0 0 ...	12 0 0
Steel Compound Stanchions	12 0 0 ...	13 0 0
Angles, Tees, and Channels, ordinary sections	11 0 0 ...	12 0 0
Flitch Plates	11 0 0 ...	12 0 0
Cast Iron Columns & Stanchions, including ordinary patterns ...	8 10 0 ...	9 0 0

METALS.

IRON—	Per ton, in London. £ s. d.	£ s. d.
Common Bars	9 0 0 ...	9 10 0
Staffordshire Crown Bars, good merchant quality	9 5 0 ...	9 15 0
Staffordshire "Marked Bars"	11 0 0 ...	—
Mild Steel Bars	9 5 0 ...	9 15 0
Hoop Iron, basis price.....	10 0 0 ...	—
" " Galvanised.....	17 10 0 ...	—
("And upwards, according to size and gauge.)		
Sheet Iron Black—		
Ordinary sizes to 20 g.	10 5 0 ...	—
" " 24 g.	11 5 0 ...	—
" " 26 g.	12 15 0 ...	—
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 10 0 ...	—
Ordinary sizes to 22 g. and 24 g.	16 0 0 ...	—
" " 26 g.	17 0 0 ...	—
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	18 10 0 ...	—
" " 22 g. and 24 g.	19 0 0 ...	—
" " 26 g.	20 10 0 ...	—

METALS (Continued).

IRON (Continued)—	Per ton, in London. £ s. d.	£ s. d.
Galvanised Corrugated Sheets—		
Ordinary sizes, 6ft. to 8ft. 20 g.	15 0 0 ...	—
" " 22 g. and 24 g.	15 5 0 ...	—
" " 26 g.	16 15 0 ...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker.....	12 10 0 ...	—
Best Soft Steel Sheets, 2 g. & 24 g.	13 10 0 ...	—
" " 26 g.	15 10 0 ...	—
Cut Nails, 3 in. to 6 in.....	11 0 0 ...	11 10 0
(Under 3 in., usual trade extras.)		

LEAD, &c.

Delivered in London.

	£ s. d.	
LEAD—Sheet, English, 4lb. and up	19 17 6 ...	—
Pipe in coils	20 7 6 ...	—
Soil pipe	23 7 6 ...	—
Compo pipe	23 7 6 ...	—
ZINC—Sheet—	In casks of 10 cwt.	
Vielle Montagne	33 15 0 ...	—
Silesian	33 10 0 ...	—
Zinc, in bundles, 1s. per cwt. extra.		
COPPER—		
Strong Sheet .....per lb.	0 1 1 ...	—
Thin " ..... "	0 1 2 ...	—
Copper nails..... "	0 1 0 ...	—
Copper wire ..... "	0 1 0 ...	—
BRASS—		
Strong Sheet ..... "	0 1 0 ...	—
Thin ..... "	0 1 1 ...	—
TIN—English Ingots..... "	0 2 2 ...	—
SOLDER—Plumbers' ..... "	0 0 10½ ...	—
Tinmen's ..... "	0 1 2 ...	—
Blowpipe ..... "	0 1 4 ...	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

15 oz. thirds	2¼d.	26 oz. fourths	4d.
" fourths	2d.	32 oz. thirds.....	5½d.
21 oz. thirds.....	3½d.	" fourths	4½d.
" fourths	3½d.	Fluted Sheet, 15 oz.	3d.
26 oz. thirds.....	4½d.	" 21 oz.	4d.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

¼ Rolled plate.....	2¼d.	Figured Rolled, Oxford Rolled, Oceanic, Arctic, Muffled, and Rolled Cathedral, white.....	3½d.
⅛ Rough rolled and rough cast plate..	2½d.	Ditto, tinted.....	5d.
⅛ Rough rolled and rough cast plate..	3d.		

* Not less than two crates.

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 2 3
" " " in barrels.....	"	0 2 4
" " " in drums	"	0 2 6
Boiled " " in barrels.....	"	0 2 6
" " " in drums	"	0 2 9
Turpentine in barrels	"	0 2 8
" in drums	"	0 2 10
Genuine Ground English White Lead, per ton (In not less than 5 cwt. lots)		28 5 0
Red Lead, Dry	"	26 10 0
Best Linseed Oil Putty	per cwt.	0 10 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak.....	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 6
Fine Elastic Carriage.....	0 12 9
Superfine Pale Elastic Carriage	0 16 0

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Extra Pale French Oil	1 1 0
Eggshell Flating Varnish	0 18 0
White Pale Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 0
Berlin Black	0 16 0
Knotting	0 10 6
French and Brush Polish	0 10 0

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* Denotes *accepted*. † Denotes *provisionally accepted*.

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Vickery Bros.	14,500 0	L. Gower, Briton Ferry*	13,454 0
White Bros.	14,434 0	D. John	13,189 16
Johns & Hampton	14,253 0		

[Architect's estimate, £13,676 10s.]

CARDIFF.—For erection of two single cottages at Llanedarne. Mr. W. Harpur, M.Inst.C.E.:—

W. H. Hewett	£796 18
Tucker Bros., Cardiff‡	662 0
W. H. Evans	638 0

‡ Recommended for acceptance.

GORLESTON.—For additions to East Anglian Institution for Blind and Deaf Children, for the Governors of the institution. Mr. John E. Burton, architect, 11, Bank-plain, Norwich:—

Carter & Wright	£2,357	W. J. Hannant	£2,163
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